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STUDIES IN THE SOCIAL SCIENCES NUMBER 3

EARLY ECONOMIC CONDITIONS AND THE DEVELOPMENT OF AGRICULTURE IN MINNESOTA

BY

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PREFACE

The original intention, in undertaking a study of the development of agriculture in Minnesota, was to prepare a statistical atlas which should put into graphic form the most significant facts relating to such development. It was believed that an extended series of maps and graphs, showing the distribution as to place and time of the various agricultural industries would be of use to those engaged in such industries, to teachers of agriculture, economic history, and economics, and to students in the field of rural economics.

As the work advanced, however, its scope extended. It soon became clear that a mere presentation of the facts in graphic form, without interpretation, would be of relatively limited advantage; and having once undertaken the task of interpretation, it became necessary to seek explanations in many directions. In the first place, since all extractive industries are largely controlled by physical environment, a preliminary survey of topography, soil, and climate was clearly indispensable. Fortunately it proved possible through the courtesy of Mr. Frank Leverett, of the United States Geological Survey, Mr. U. G. Purssell, Director of the Weather Bureau station at Minneapolis, and Mr. A. Walfred Johnston, Instructor in the Department of Geology and Geography, University of Minnesota, to include new maps relating to the glacial soils, altitudes, and climate of Minnesota, which record the latest available data in these several fields. Some of these will presumably interest many not directly concerned with agriculture. Again, various economic developments were the result of historical causes, and an interpretation of these presupposed a survey of the sources and routes of settlement and transportation, especially during the pre-railroad era. Finally, when it came to agriculture itself, the census returns, separated by ten-year intervals, were found not to record a number of interesting movements, which ran their course in less than a decade; and even when the facts were recorded in the census, their explanation usually had to be sought elsewhere. As a result it was necessary to go through a great mass of contemporary publications and in numerous cases to interview or correspond with men who experienced the development which this work seeks to explain. These sources are partially listed in the notes. This part of the work demanded much time and has considerably delayed the publication. Even with assistance from all available sources, various problems remain but partially solved. In these cases it is hoped that the maps, graphs, and tables at least offer the laboratory material which may assist other investigators to a final solution.

On this account and also because many of the statistics are scattered and not generally accessible, it has seemed worth while to include in the appendix a somewhat extended series of tables from the census, the state statistics, and other sources.

One of the most difficult questions, not however of a statistical nature, concerned the maps of Minnesota. No mathematically accurate maps of Minnesota as a whole, showing civil boundaries at different periods, appear ever to have been made, nor are any likely to become available until the topographic survey of the State by the United States Geological Survey is completed. This uncertainty is greatest in the matter of county boundaries, especially for the earlier decades. As a base map was indispensable for each census period, a general base map of the State was prepared and on this the boundaries at each census year were laid down according to the best contemporary maps, checked by reference to the state statutes and the census. In this way it is hoped that approximate accuracy was attained, though it should be noted that no skilled map makers were available and mathematical precision was not thought necessary for the purpose in hand.

In some cases, moreover, the census and the state laws are apparently in flat contradiction as to the existence of certain counties, while even the state statutes themselves are strangely inconsistent and contradictory. Thus in the map of 1860 (J. S. Sewall and C. W. Iddings) Pipestone and Rock counties were transposed. This was owing to a mistake of the legislature in 1858 which was corrected in 1862 (Special Laws of Minn. 1862, chap. 30). Lac qui Parle County was originally north of the Minnesota River, but this was subsequently included in Chippewa County (Laws of Minn. 1868, chap. 113, sec. 1). The census of 1870 however recognized both Chippewa and Lac qui Parle counties. Swift County was formed out of Chippewa (Laws of Minn. 1870, chap. 90) but the census reported it as formed from Lac qui Parle (Census 1890, Population, Pt. 1, p. 26). Traverse County as established in 1868 overlapped Big Stone to the extent of several townships (Laws of Minn. 1868, chap. 109). The legislature also made several attempts to establish a Lincoln County, apparently forgetting each time what it had done previously, before the present Lincoln County was defined; and this gave rise to not a little confusion.

In connection with this investigation relating to agriculture, it seems proper that attention be called to the urgent need of general state statistics, so arranged as to supplement and unify those issued by the several state departments. Minnesota began the publication of state statistics as soon as it became a state. After 1861 there was an unfortunate lapse which renders the interpretation of the Civil War period difficult and fragmentary at best. In 1868, however, the second series began, and, with the exception of a single year, when the legislature failed to make an appropriation, this second series covers the thirty years, 1868-1898. There it stopped, owing apparently to legislative opposition. As a result, the most recent period in the history of the State is the one most difficult to interpret. In fact, by reason of this lack, the decade from 1900 to 1910 took as much time as the preceding fifty years; and the result is less satisfactory than for any previous decade since the territorial period, except only that of the Civil War. For example, there is no possible means of tracing the decline of the acreage in wheat from 50.69 per cent of all tilled land in 1899 to 25.73 per cent in 1909; yet this meant an agricultural revolution. This difficulty, moreover, is one certain to increase with the passage of time, rendering it less and less possible to understand the course of our agricultural and general economic development, at the very time that the whole State is filled with talk about the back-to-the-land movement. If this movement or any movement for the advancement of economic efficiency is really to have result, and not end in talk, as usually happens, the necessary point of departure would seem to be the re-establishment of a comprehensive system of state statistics covering all lines of economic activity. Certainly until there is available exact and comprehensive information regarding present conditions and tendencies, it is futile to undertake any systematic plan of bettering these conditions.

This argument is not meant to imply that the old state statistics were perfect—far from it—nor that it would be an easy matter to organize a satisfactory system; but it is not believed that the difficulties are insuperable. It is indeed true that so long as live stock are subject to taxation, it is useless to expect an accurate return of such property from assessors. The motives to concealment are too strong. On the other hand, there is no reason why the assessors should not ascertain and report with substantial accuracy the acreage in the several crops and the yield of each, together with the location, character, employees, and capital of fishing, lumbering, mining or quarrying, manufacturing, and trading concerns. Most of these industries, aside from manufactures, are inadequately reported by the United States census; and even the census returns on manufactures are practically limited to the three large cities, together with a brief summary for the State as a whole. On this account, the material does not now exist for an analysis of any industry in Minnesota, aside from agriculture; nor is there any hope of obtaining it, even to the extent necessitated by such a study as this upon agriculture, unless the State shall establish an adequate system of state statistics. Moreover, the expense need not be large. If only there were a permanent state statistician, having scientific qualifications, and it were again made the duty of all assessors to collect the required data, in return for a reasonable compensation, it is believed that the statistician would be able to furnish the kind of information which is indispensable alike for intelligent legislation, wise administration, and scientific investigation.[1]

In addition to the gentlemen previously named, thanks are due to the authorities of the University Library, to several of the departments at Washington as well as the State Capitol, and to many individuals, of whom a few are named in the notes. Col. William W. Folwell and Mr. Frank Leverett kindly read portions of the proof and made valuable suggestions; though the author of course assumes full responsibility for all statements. Special mention should also be made of those who have served as research assistants during the progress of the investigation, namely, Mr. R. A. Graves, who began the work on county boundaries and maps; Mr. Stanley Gillam, who continued the statistical maps; Mr. Bo Westman, who was employed on the tables; and Mr. Fred G. Tryon, who worked on the analysis tables and graphs, and has verified numerous references. All of these manifested an interest and zeal which have been of distinct advantage in the undertaking.

In this connection it should be noted that in view of the immense amount of detailed work involved, this investigation was only made possible through the legislative appropriation for scientific investigation and research.

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[1] Compare the remarks of Mr. D. A. Wallace, *Proceedings Minn. Agr. Soc.* (1911), 231.

CHAPTER I

PHYSICAL FEATURES AND CLIMATE

Area and location

The area of Minnesota is 84,682 square miles, including 80,858 square miles of land and 3,824 square miles of water surface.[1] From the projecting corner north of the Lake of the Woods to the southern boundary, the distance is approximately 400 miles, while the greatest width, north of Lake Superior, is 357 miles. By way of comparison it may be noted that the area of Great Britain (England, Wales, and Scotland) is 88,729 square miles.

Minnesota occupies almost the exact geographical center of North America and contains the sources of three great drainage systems flowing in opposite directions: the Mississippi, the St. Lawrence, and the Nelson. (Figs. 1 and 3.)

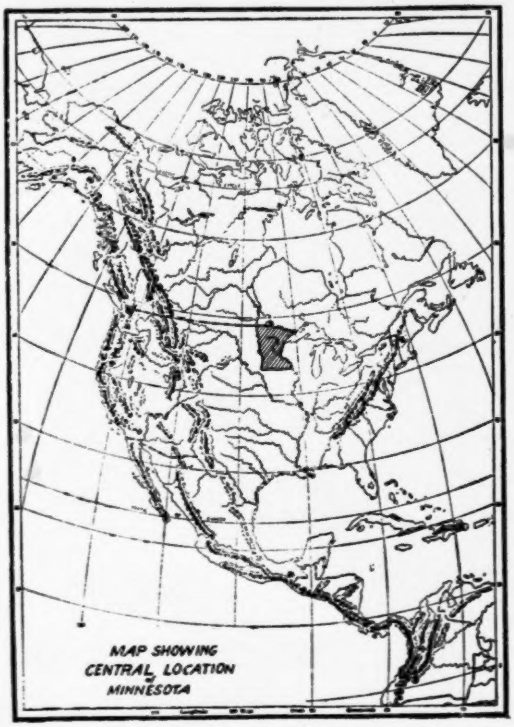

Figure 1. Map of North America showing central location of Minnesota.

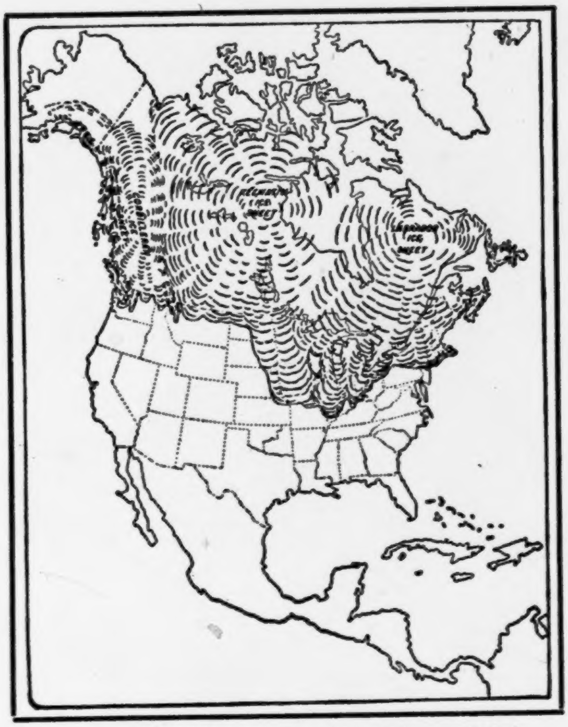

Figure 2. Map showing greatest extent of former glaciation in North America. (After U. S. Geol. Survey)

This central location has affected the economic development of Minnesota in many ways. Owing to the short distances separating navigable waters on the several systems, Minnesota early became a great thoroughfare for white men as it had been for the Indians. The abrupt transition from forest to prairie made lumbering and farming mutually complementary industries. The altitude of the plateau which carries the main divides provided water-power to mill the product of forest and farm. And the enormous deposits of iron ore in the northern part of the plateau assured a many-sided economic activity. Still more important in connection with agriculture are certain facts as to soil and climate.

Underlying formations and glaciation

The geological history of Minnesota is complex and much of it not pertinent to the purpose of the present investigation, especially as the continental ice sheet removed or covered most of the residual soils. The present soil is therefore largely of glacial origin. Only a small area in the extreme southeastern corner, like the adjacent portions of Wisconsin, Illinois, and Iowa, escaped glaciation, presumably because the ice sheets were diverted by highlands and followed pre-existing valleys.

Nevertheless, the underlying formations have not been entirely without effect on topography and soil, and, therefore, on agricultural development. Glaciers do indeed modify profoundly the face of nature, but after all they flow under the influence

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[1] U. S. Geol. Survey, Bul. 302. Other figures of earlier date are given in the *Geol. and Nat. Hist. Survey of Minn.* I, 114.

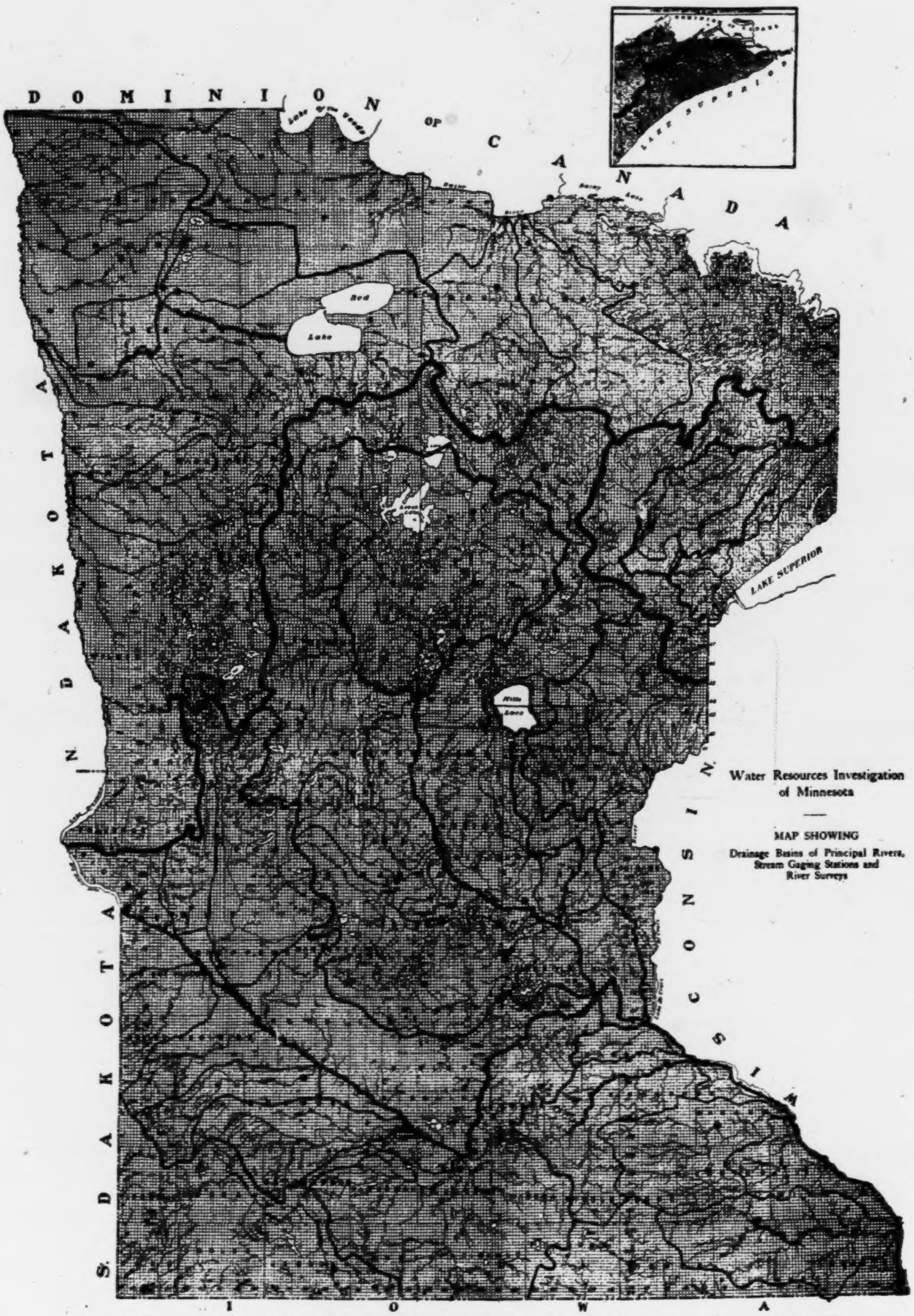

DOMINION OF CANADA
Lake of the Woods
Red Lake
Mille Lacs
LAKE SUPERIOR
N. DAKOTA
S. DAKOTA
WISCONSIN
IOWA
Water Resources Investigation of Minnesota
MAP SHOWING
Drainage Basins of Principal Rivers, Stream Gaging Stations and River Surveys

Figure. 3. The principal divides, showing area of drainage basins. Dots indicate gaging stations and heavy lines show surveys on rivers. (After Water Resources Investigation)

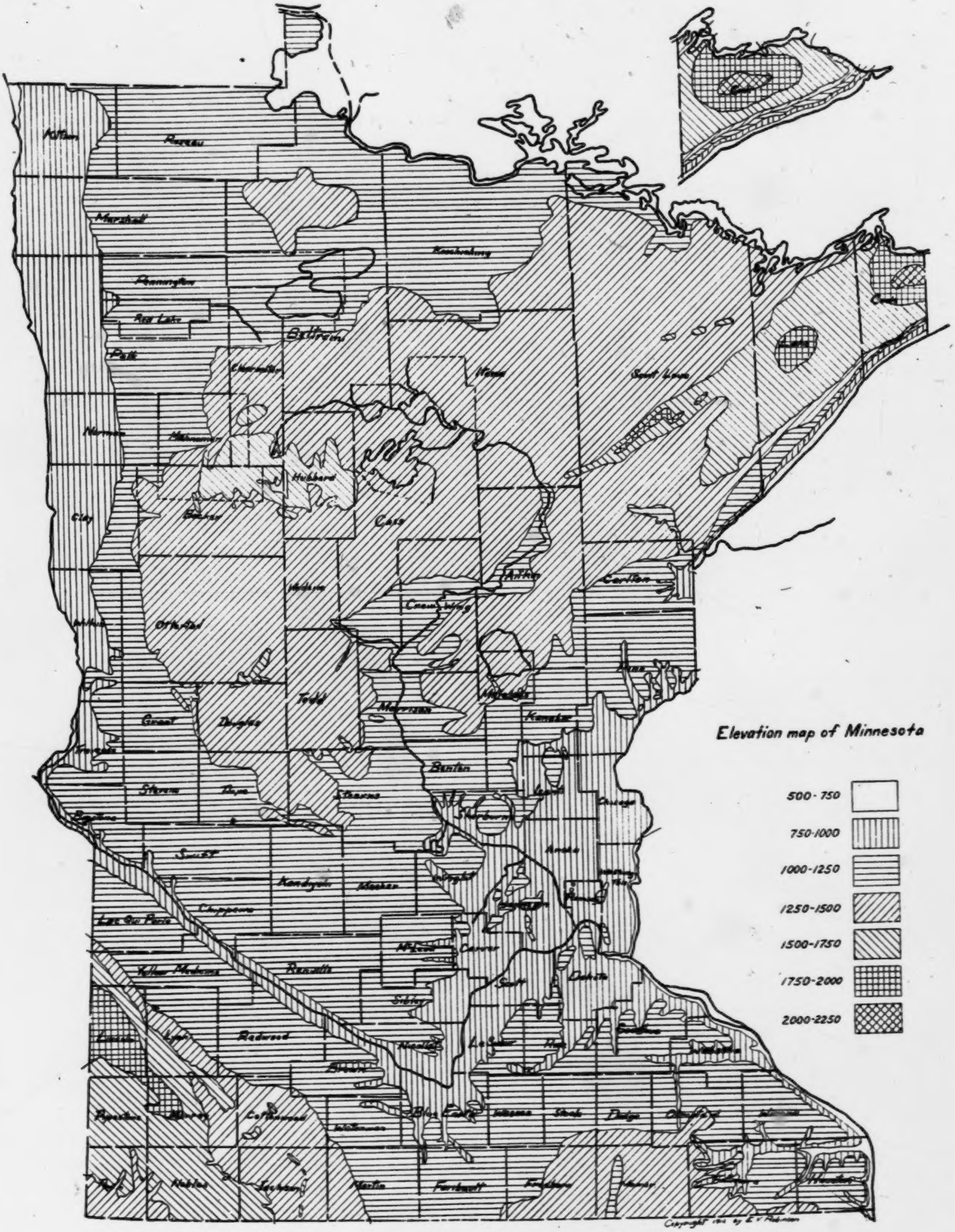

Elevation map of Minnesota
500-750
750-1000
1000-1250
1250-1500
1500-1750
1750-2000
2000-2250
Kittson
Roseau
Marshall
Koochiching
Pennington
Red Lake
Beltrami
Polk
Itasca
St. Louis
Clearwater
Norman
Mahnomen
Hubbard
Clay
Becker
Cass
Cook
Lake
Wadena
Aitkin
Carlton
Crow Wing
Otter Tail
Wilkin
Pine
Todd
Morrison
Grant
Douglas
Kanabec
Benton
Stevens
Pope
Stearns
Sherburne
Isanti
Chisago
Big Stone
Swift
Anoka
Kandiyohi
Meeker
Wright
Chippewa
Lac Qui Parle
McLeod
Carver
Renville
Scott
Dakota
Yellow Medicine
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Watonwan
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Houston

Figure 4. Elevation map of Minnesota. (By A. W. Johnston)

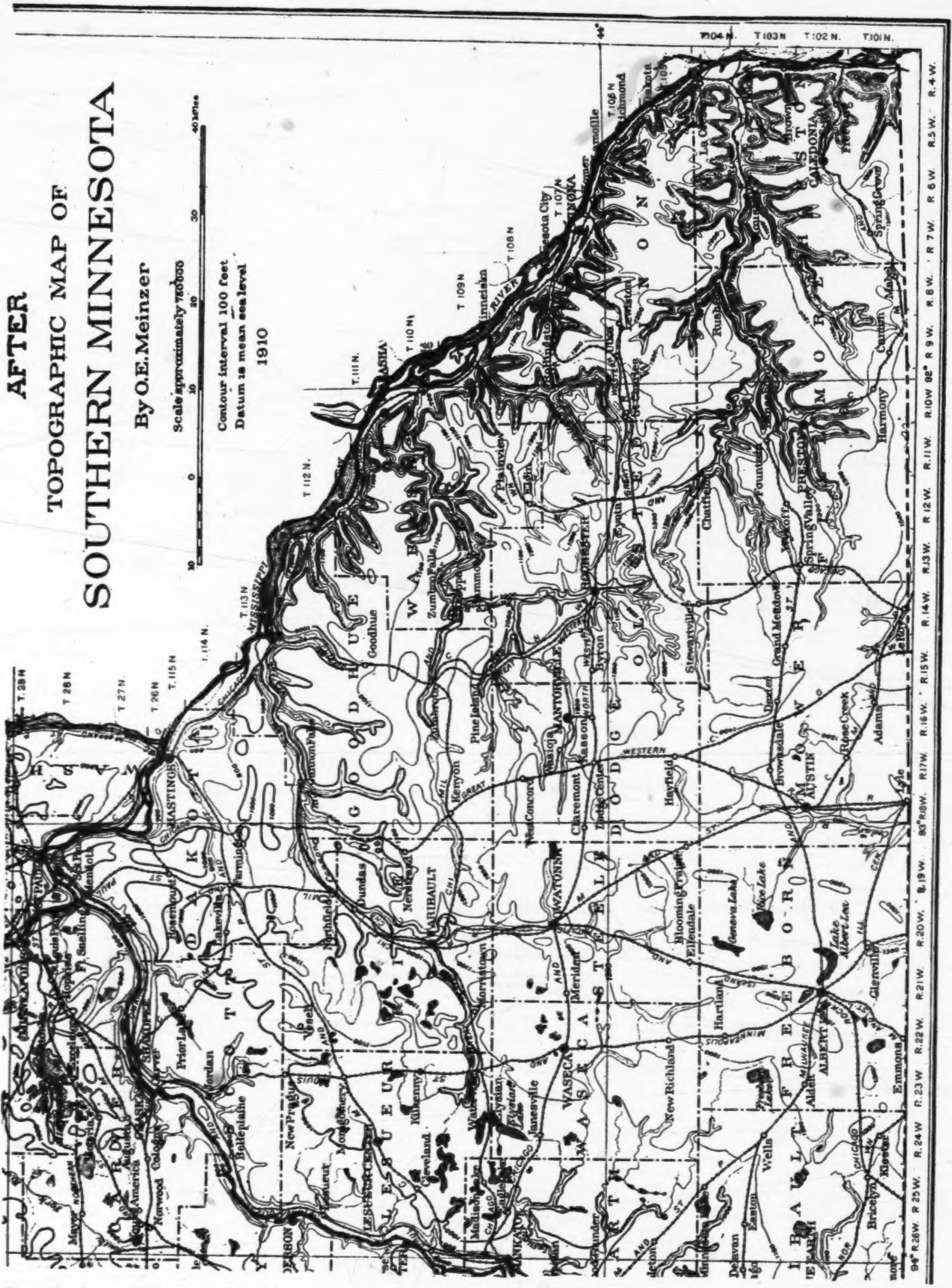

AFTER
TOPOGRAPHIC MAP OF
SOUTHERN MINNESOTA
By O.E. Meinzer
Scale approximately
Contour interval 100 feet
Datum is mean sea level
1910
MISSISSIPPI
RIVER
HASTINGS
FARIBAULT
OWATONNA
WASECA
AUSTIN
ALBERT LEA
PRESTON
CALEDONIA
Goodhue
Wabasha
Winona
Rochester
Mankato
Shakopee
Northfield
Dundas
Zumbrota
Kenyon
Hayfield
Spring Valley
Harmony
Chatfield
Rushford
Lewiston
Plainview
Elgin
Byron
Dodge Center
Claremont
West Concord
Mantorville
Kasson
Blooming Prairie
Ellendale
Geneva Lake
Hartland
Glenville
Emmons
Wells
Easton
Delavan
Janesville
Elysian
Waterville
Morristown
Le Sueur
Le Center
Montgomery
New Prague
Belle Plaine
Jordan
Prior Lake
Lakeville
Farmington
Rosemount
New Richland
Waldorf
Grand Meadow
Stewartville
Wykoff
Fountain
Brownsdale
Rose Creek
Adams
Lyle
Mabel
Canton
Spring Grove
Houston
Hokah
T. 104 N.
T. 103 N.
T. 102 N.
T. 101 N.
R. 4 W.
R. 5 W.
R. 6 W.
R. 7 W.
R. 8 W.
R. 9 W.
R. 10 W.
R. 11 W.
R. 12 W.
R. 13 W.
R. 14 W.
R. 15 W.
R. 16 W.
R. 17 W.
R. 18 W.
R. 19 W.
R. 20 W.
R. 21 W.
R. 22 W.
R. 23 W.
R. 24 W.
R. 25 W.
R. 26 W.

Figure 5. Contour map of southeastern Minnesota showing advanced dissection of the driftless area and the relation of railroads to topography. (U. S. Geol. Survey, Water Supply Paper 256)

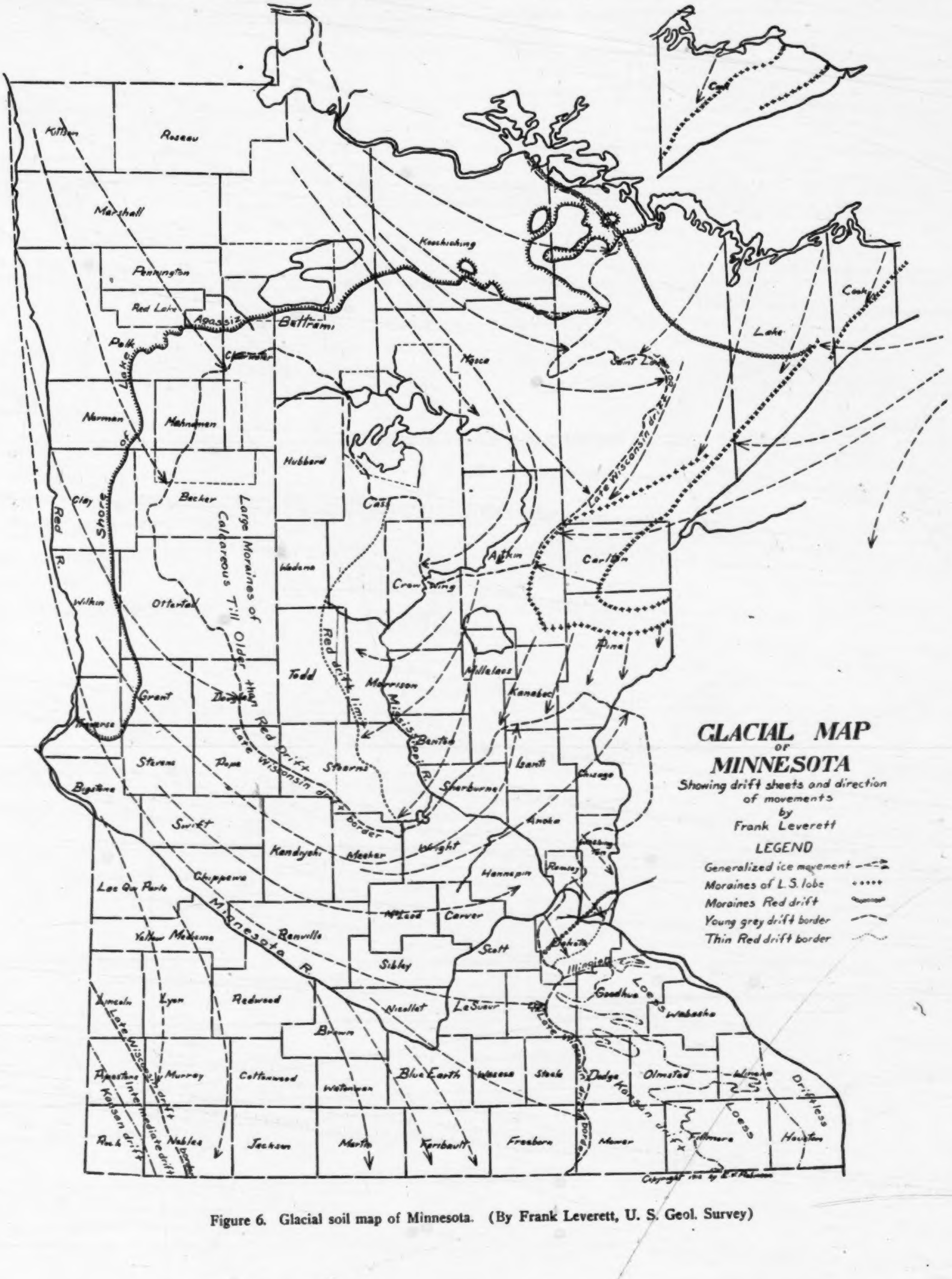

GLACIAL MAP
OF
MINNESOTA
Showing drift sheets and direction of movements
by
Frank Leverett
LEGEND
Generalized ice movement
Moraines of L. S. lobe
Moraines Red drift
Young grey drift border
Thin Red drift border
Kittson
Roseau
Marshall
Pennington
Red Lake
Polk
Lake Agassiz
Beltrami
Koochiching
Clearwater
Itasca
Saint Louis
Lake
Cook
Cook
Norman
Mahnomen
Hubbard
Cass
Clay
Becker
Shore of Lake Agassiz
Red R.
Large Moraines of Calcareous Till Older than Red Drift
Late Wisconsin drift
Wadena
Crow Wing
Aitkin
Carlton
Wilkin
Ottertail
Todd
Red drift limit
Morrison
Mille Lacs
Kanabec
Pine
Grant
Douglas
Traverse
Stevens
Pope
Late Wisconsin drift border
Stearns
Benton
Mississippi R.
Isanti
Chisago
Sherburne
Big Stone
Swift
Kandiyohi
Meeker
Wright
Anoka
Washington
Hennepin
Ramsey
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Minnesota R.
Renville
Scott
Dakota
Sibley
Illinoian
Goodhue
Loess
Wabasha
Lincoln
Lyon
Redwood
Nicollet
LeSueur
Brown
Late Wisconsin drift border
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Driftless
Late Wisconsin drift
Intermediate drift
Kansan drift
Kansan drift
Loess
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

Figure 6. Glacial soil map of Minnesota. (By Frank Leverett, U. S. Geol. Survey)

of gravity, much like a river; and while they bring some drift from a great distance, the larger part is of local origin. Any rock formation reaching the surface over a considerable area will therefore somewhat affect the character of glacial soil deposited upon it, as well as farther along in the glacial channel.

Uplands and lowlands

Prior to the ice invasions, the valleys were generally deeper, the surface more rolling and more thoroughly drained, than is now the case outside of the driftless area. The principal valley at that time apparently extended from north to south, approximately through the elbow of the present Minnesota Valley, as appears from the distance to bed-rock in different parts of the State. This was part of a preglacial depression due primarily to folding.

The present elevation of the surface is in part the result of preglacial conditions, notably in case of the highlands north of Lake Superior, where glacial stripping doubtless exceeded glacial deposition. There has also been a differential tilting of the surface during or since the glacial age, as shown by the greater elevation toward the north of the beaches of former Lake Agassiz. In part, however, the present elevation and slope of the surface in Minnesota result from the amount of earth and rocks dropped in different localities by the melting ice, together with subsequent erosion by running water.

The greatest altitude in Minnesota is 2,230 feet, north of Lake Superior. Two other regions exceed 1,500 feet; one north of the Minnesota and west of the Mississippi, culminating in Hubbard, Clearwater, and Becker counties, and containing, at about 1,750 feet, the divide between the sources of the Mississippi and the Red River of the North; the other extending across the southwestern corner of the State and forming the divide between the Mississippi and Missouri valleys. This ridge, called the "Shining Mountains" in Carver's account of his explorations,[2] and the "Coteau des Prairies" by the French fur traders, is deeply covered with glacial drift and marks the southwestern limit, in Minnesota, of the later or Wisconsin stage of glaciation. Another upland is found east of the center near the southern border, chiefly in Mower and Freeborn counties. This upland, which reaches 1,412 feet elevation,[3] is a plateau rather thinly covered with drift and forms the divide from which streams flow south to the Cedar River, north to the Minnesota, and east directly to the Mississippi.

The lowest elevation in Minnesota is 602.2 feet[3] at the surface of Lake Superior. There is, however, only a small area of lowlands surrounding Lake Superior. This was formerly flooded when the lake stood at various higher levels, toward the end of the glacial period. Aside from this old lake bed, the lowest elevation is found in the Mississippi-Minnesota bottoms, which stand 615 feet above the sea at the Iowa line.[4] Another region of relatively low elevation is the Red River Valley which, at the Canadian line has an altitude of only 748 feet above sea level.[4] The average elevation for the State is estimated at 1,200 feet.[3]

Soil provinces

During the last or Wisconsin period of glaciation the ice sheet entering the State from the northeast carried the characteristic red drift, derived from the Lake Superior region, considerably beyond the present course of the Mississippi River. Later the Keewatin ice sheet, advancing from the northwest and entering through the Red River Valley, spread a gray drift over most of the western and southern part of the State. Southeast from Red Lake, a broad lobe of this ice sheet overrode the red drift, depositing gray on top of red more than two thirds of the way to Lake Superior. Approaching the south, the ice sheet carrying the gray drift covered all the State between the Coteau des Prairies in the southwest, and the plateau in Mower County toward the east, and overflowed southward into Iowa. A large arm of this ice sheet also turned to the northeast through the Minnesota Valley and overrode the red drift to, and even a little beyond, the present course of the St. Croix River in Washington and Chisago counties.

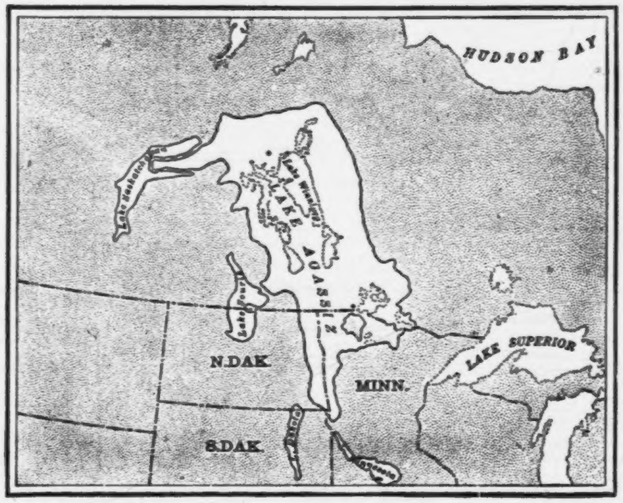


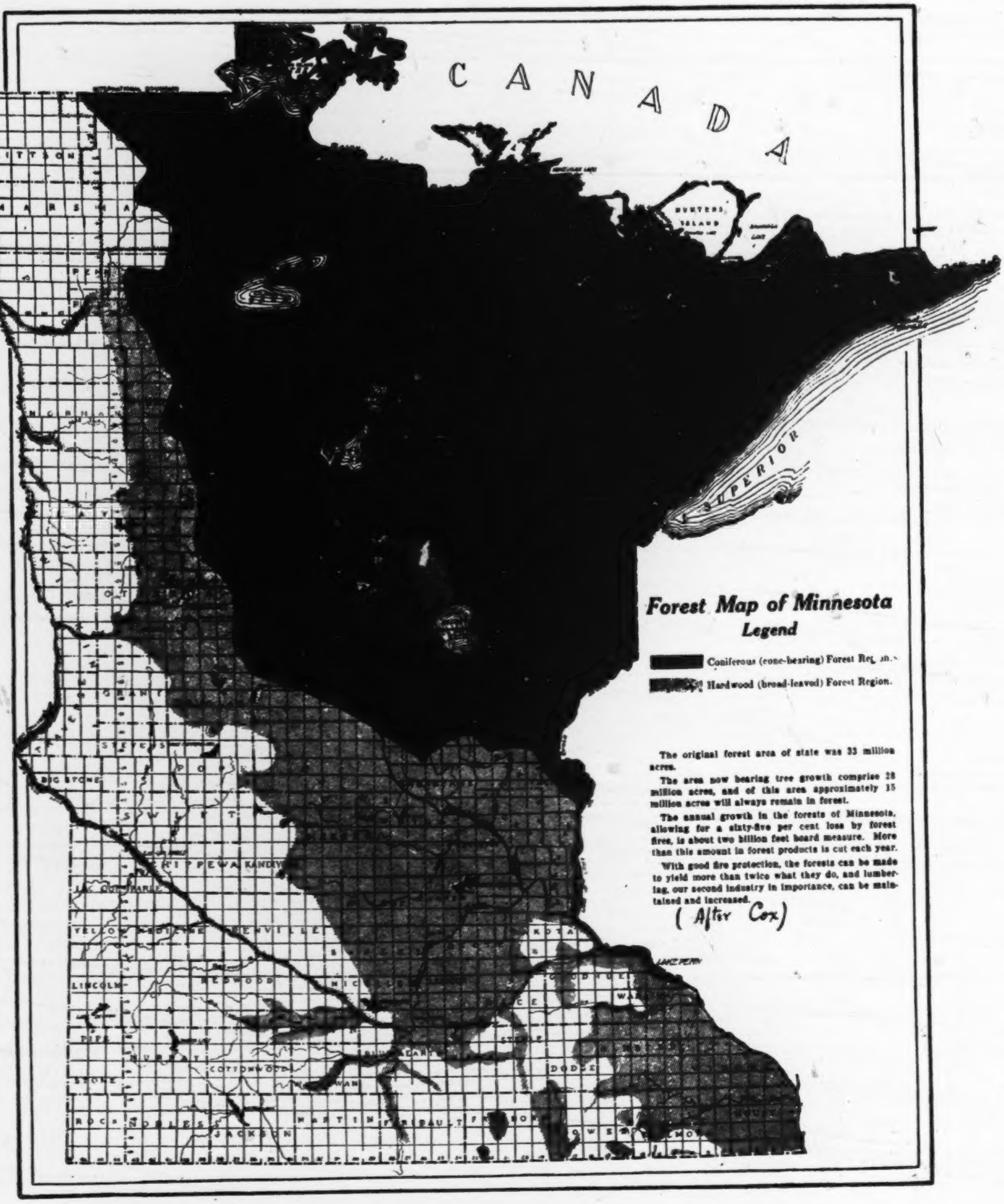
Figure 7. Glacial Lake Agassiz (Upham, U. S. Geol. Survey). A re-examination, however, indicates that the island shown in Lake Agassiz was covered at the highest stage.[4]

In favorable circumstances both types of drift form heavy soils. In general, however, the gray drift, derived in larger part from shale and limestone, has proved the more fertile. In fact, most of the successful farming in the State has been and still is on the gray drift, together with the older drift and the area formerly covered by Lake Agassiz. This fact is, however, due not merely to difference in soil composition, but also to elevation, slope, forest cover, and possibly in some measure to climate.

During the recession of the ice sheet Lake Agassiz was formed against its southern face, in the Red River Valley. This glacial lake at its maximum development exceeded in size the five Great Lakes of to-day.

For many years it was assumed that other glacial lakes, called Lake Minnesota and Lake Undine, occupied the region south of the Minnesota elbow during the retreat of the ice sheet. This theory seemed to explain the generally level surface (except where cut by recent steep-sided valleys) and the heavy soil of a considerable area in Blue Earth and adjacent counties

[2] Carver, Jonathan, *Travels through the Interior Parts of North America in the Years* 1766, 1767, *and* 1768 (London 1781), 451.
[3] Weather Bureau, *Summary of Climatological Data for the United States*, secs. 55, 56.
[4] State Drainage Commission, *Water Resources Investigation of Minnesota*, 132, 392.


CANADA
SUPERIOR
HUNTERS ISLAND
LAKE PEPIN
KITTSON
NORMAN
BIG STONE
SWIFT
KANDIYOHI
LAC QUI PARLE
RENVILLE
LINCOLN
REDWOOD
COTTONWOOD
JACKSON
DODGE
Forest Map of Minnesota
Legend
Coniferous (cone-bearing) Forest Region.
Hardwood (broad-leaved) Forest Region.

The original forest area of state was 33 million acres.

The area now bearing tree growth comprise 28 million acres, and of this area approximately 15 million acres will always remain in forest.

The annual growth in the forests of Minnesota, allowing for a sixty-five per cent loss by forest fires, is about two billion feet board measure. More than this amount in forest products is cut each year.

With good fire protection, the forests can be made to yield more than twice what they do, and lumbering, our second industry in importance, can be maintained and increased.

(After Cox)

Figure 8. Original forest areas in Minnesota. (After First Report of Minnesota State Forester)

which somewhat resembles the Red River Valley. However, a recent examination by the United States Geological Survey has failed to find any evidence of beach lines.[5] It follows that if the lakes in question ever existed, they must have been very ephemeral. Surface and soil are apparently the result of location at the bottom of the main glacial channel southward into Iowa during the Wisconsin period of glaciation.

In both the southeastern and southwestern parts of the State, areas of glacial drift older than the Wisconsin period are exposed. A part of this older drift is also covered with loess, a fine silt deposited by the wind, probably between the earlier and the later glaciations. Both the older drift, which is calcareous like the gray Wisconsin, and the loess are very fertile.

The forest areas

The forests of Minnesota have been a factor of prime importance, not only in the commercial development of the State, but also in relation to agriculture. Originally the driftless area and the bordering belt of loess were covered with hardwood; while the "Big Woods," also composed of broad-leaved trees, extended up the Minnesota to the big bend. All the rest of southern and western Minnesota was treeless, except along the streams; while the northern part of the State, aside from the Red River Valley, bore dense coniferous forests, comprising largely white, Norway, and jack pine. These differences as to cover, however they originated, extend in a measure to the soil.

The prairie grasses, growing and decaying more rapidly than forest vegetation, have given to the prairie soil a darker color and a larger proportion of vegetable humus than the forest soils possess. This contrast is less noticeable in the intermediate belt of deciduous forest, but becomes very striking in the northern coniferous zone, especially where the red drift lies on the surface. For this reason the United States Bureau of Soils has taken the boundary between forest and prairie in Minnesota as marking a distinction in the type of soil wherever the surface is drift covered. (Bul. 85, Bureau of Soils.)

In view of the origin, composition, slope, and cover of the soil, Minnesota may be divided into the following five geographical provinces, with special reference to agriculture.

(1) The driftless area, with the adjacent loess-covered belt, in southeastern Minnesota, marked by well-developed drainage, rolling surface, and only moderately fertile soil.

(2) The drift-covered prairie and the deciduous forest zone outside the bed of Lake Agassiz. This region contains numerous belts of terminal moraines and sandy outwash plains which cause the soil to vary greatly in fertility. The drainage is also imperfect in places, some of the prairie sloughs lacking outlets and much of the bottom land, especially along the Minnesota River, being subject to overflow. On the whole, however, there is in this province a large proportion of arable land of high fertility; and most of it is already under cultivation. The areas of older drift in the southeast, southwest, and northwest are in general somewhat better drained and therefore more fully cultivated than the younger drift; though the surface soil is more leached.

(3) The bed of glacial Lake Agassiz. In this area the finest parts of the soil carried by the ice or washed from the surrounding lands were deposited toward the center of the lake, where the water was deepest. This was the origin of the heavy clay soils which have made the Red River Valley one of the greatest wheat-growing regions in the world. There are, indeed, patches of sand and gravel in the midst of the best soil, where glacial streams formerly reached the lake; and there are also long ridges of sand, flanked on either side by sandy loam, marking former beaches of the lake.

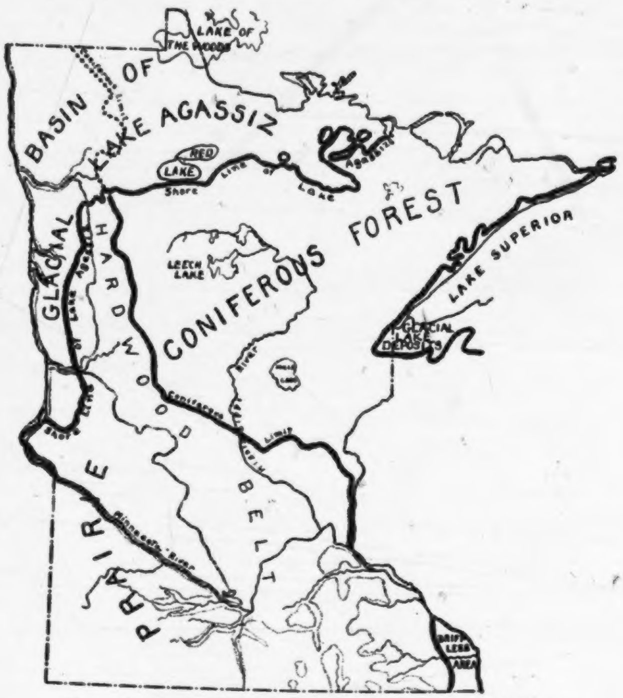


Figure 9. Geographical provinces based on soil and forests. (After Figures 6, 8, and monograph LII, U. S. Geol. Survey, 453.)

The great defect of this lacustrine basin is the lack of adequate natural drainage channels. For this reason the State has made provision for a very extended system of drainage ditches and canals; and a federal survey has been made looking to participation by the United States in the work of draining the ceded portions of the Red Lake Indian reservation. Nearly everywhere the fall is adequate, if only proper channels are provided. There is consequently no reason to doubt that eventually practically all of the lacustrine soils of Minnesota, including the forested and swampy region north of Red Lake, will be occupied by a prosperous agricultural population. At present the heavy clay soils within twenty or thirty miles of the Red River are under the plow, wherever sufficiently drained; but between the several beach lines there are large areas not yet brought under cultivation. Here is one of the most promising districts for agricultural development.

(4) The former bed of Lake Superior, when the lake stood at higher levels. The slope in this area is generally steeper and the drainage better than in the basin of Lake Agassiz. Being in the coniferous zone, agricultural development has hitherto lagged; though there is considerable good soil, with cheap water transportation to market.

[5] Result communicated by Mr. Frank Leverett, geologist in charge of the examination (October 15, 1913).

(5) The coniferous zone, outside of the Lake Agassiz and Lake Superior basins. This province has, on the average, a considerably greater elevation than any other in the State (Fig. 4). Nevertheless, owing to the characteristic inchoate drainage of young drift, there are extensive areas of marsh lands subject to overflow. Large parts of these marshes will become valuable for agriculture when drained. The soil in the coniferous zone, however, varies in quality not only from section to section but from acre to acre. The numerous morainic belts contain considerable clay and sometimes bear more or less hardwood. These are excellently adapted to dairy farming, though the surface is often too rocky or too broken for the plow. The more level tracts, on the other hand, are apt to be outwash plains, sandy and originally covered with jack pine, though good alluvial soil appears in the valleys. In general, sand and sandy loams predominate west of a line extending irregularly from Cloquet to International Falls, approximately along the margin of the gray drift; while east of that line rock outcrops and drift boulders become increasingly numerous. There is some farming of the mixed and dairy types, especially in the southern part of the zone; and the settlement of this region is likely to proceed rapidly in future, particularly in the western part and also on the heavy lacustrine soils near Lake Superior. Nevertheless, appreciable areas have already been set aside as permanent forests under either state or federal control; and there are other large districts, notably in the rocky eastern part north of Lake Superior, which in the long run may grow trees more profitably than any other crop, just as is the case in Maine. In the map published in the first report of the State Forester (Fig. 8), there were estimated to be 15 million acres in Minnesota better suited to forest than to any other use: in the absence of a detailed soil survey and land classification map, it is impossible to give exact figures.

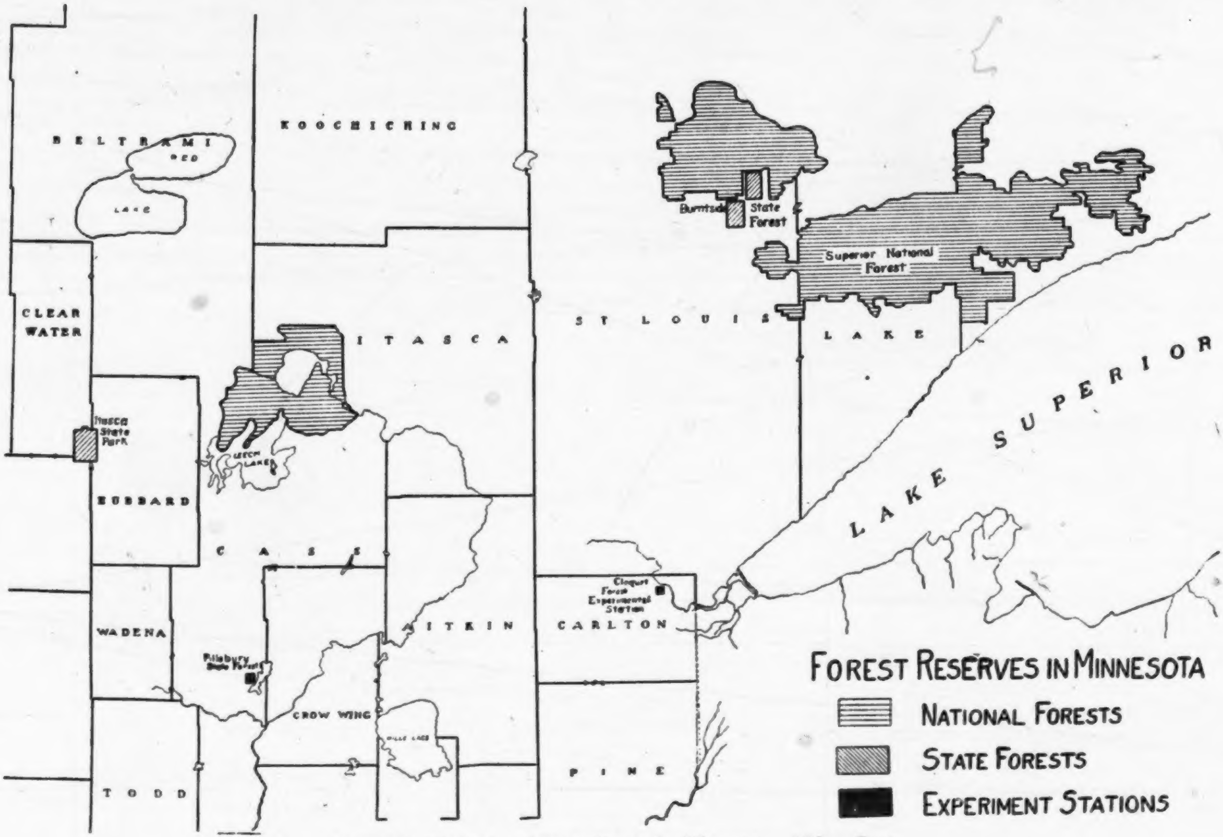

BELTRAMI
RED
LAKE
KOOCHICHING
CLEAR WATER
Itasca State Park
HUBBARD
ITASCA
LEECH LAKE
CASS
WADENA
Pillsbury State Forest
CROW WING
MILLE LACS
AITKIN
TODD
Burntside State Forest
Superior National Forest
ST LOUIS
LAKE
LAKE SUPERIOR
Cloquet Forest Experimental Station
CARLTON
PINE
FOREST RESERVES IN MINNESOTA
▤ NATIONAL FORESTS
▨ STATE FORESTS
■ EXPERIMENT STATIONS

Figure 10. Federal and state forests in Minnesota. (After Cox)

Extremes of temperature

Owing to its central location in North America, Minnesota has a distinctively continental climate, marked by wide variations of temperature. The greatest change recorded at any one place is from 103 degrees F. above to 59 degrees F. below zero, at St. Vincent—an extreme range of 162 degrees F.[6]; though of course the ordinary annual range is much less.

The cold of winter is supposed to stimulate energy and promote forethought. However this may be, frost undoubtedly does promote the disintegration of pebbles in the drift, thus releasing constantly new supplies of plant food; and it provides excellent roads, for some three months each year, wherever the ground is fairly level, especially in swampy areas. This effect of the freeze-up in facilitating transportation has been a great factor in the rapid cutting-away of forests, and also in the development of agriculture.

[6] U. S. Weather Bureau at Minneapolis.

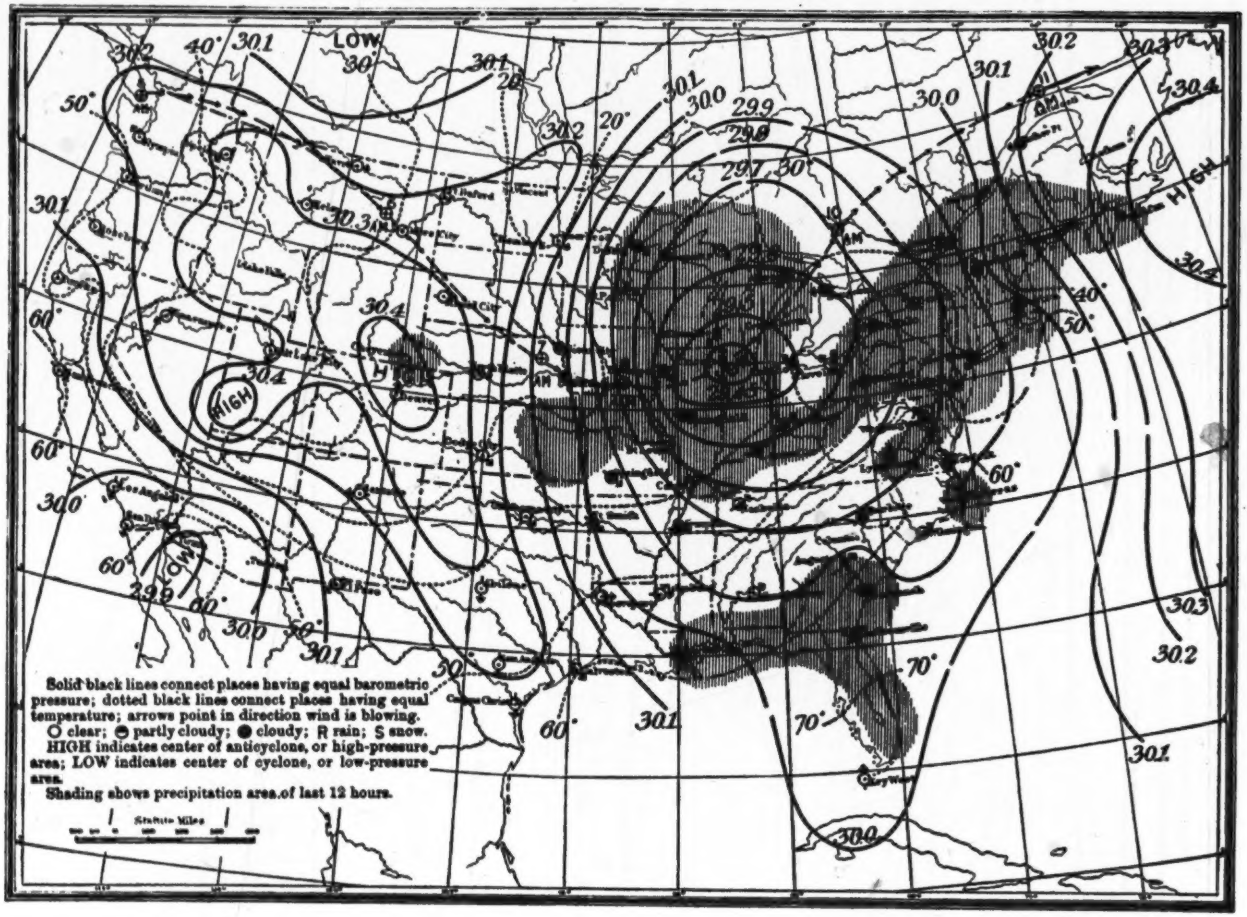

Solid black lines connect places having equal barometric pressure; dotted black lines connect places having equal temperature; arrows point in direction wind is blowing.
○ clear; ◒ partly cloudy; ● cloudy; R rain; S snow.
HIGH indicates center of anticyclone, or high-pressure area; LOW indicates center of cyclone, or low-pressure area.
Shading shows precipitation area of last 12 hours.
Statute Miles
LOW
HIGH
30.2
30.1
30.0
29.9
29.8
29.7
30.3
30.4
40°
50°
60°
70°
30°
20°

Figure 11. Weather map, showing conditions on April 9, 1904—8 a. m. (Bul. Q., U. S. Weather Bureau)

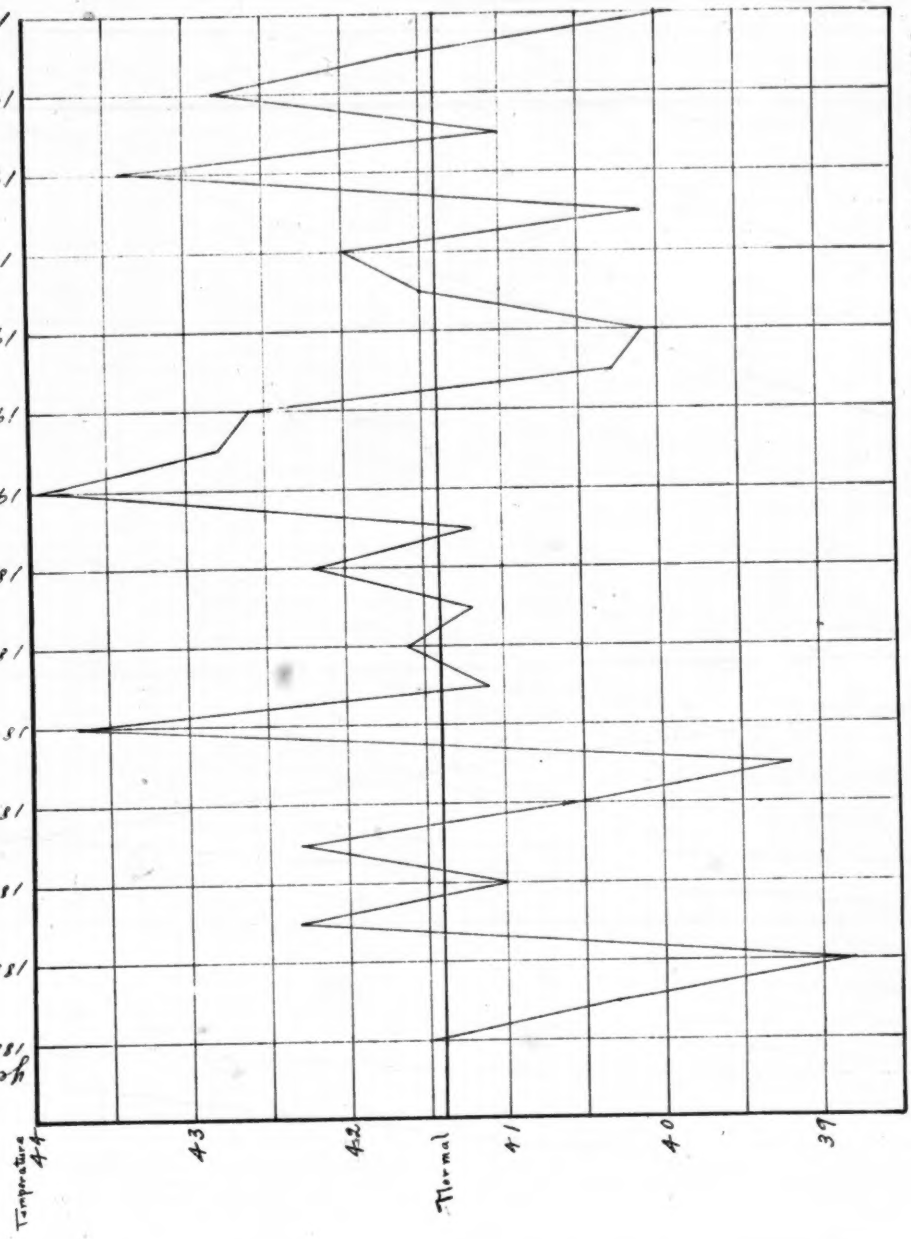


Figure 12. Chart showing average annual temperature for Minnesota, 1886-1912 inclusive. Figures indicate degrees Fahrenheit.[7]

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[7] Based on figures furnished by the U. S. Weather Bureau at Minneapolis.

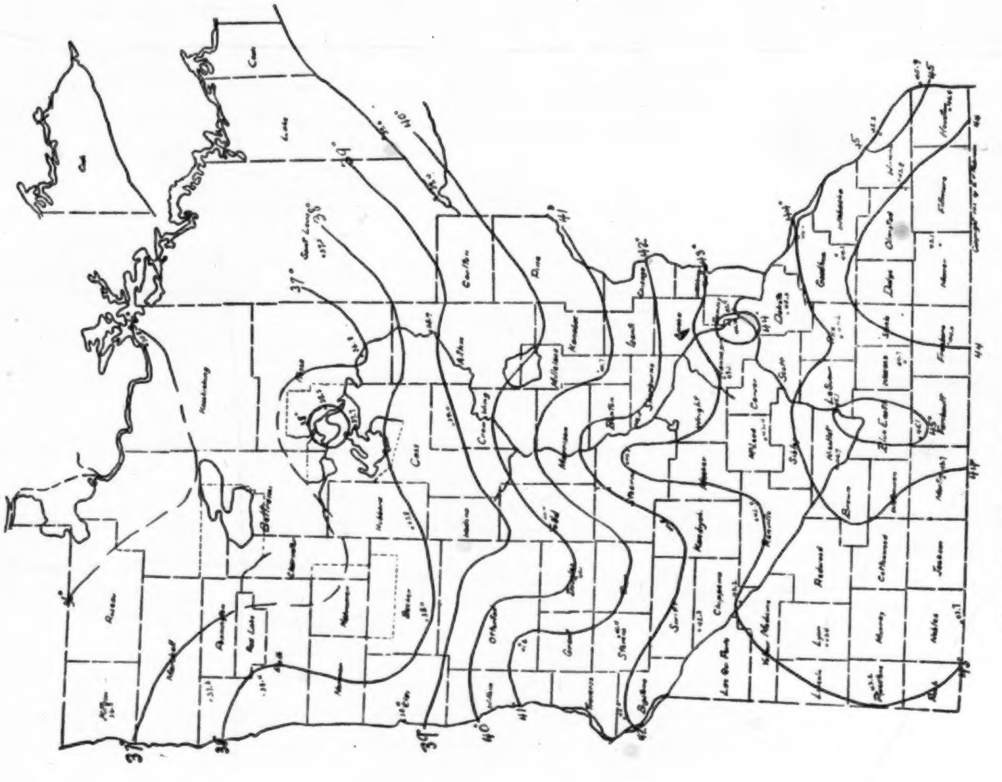
37°
38°
39°
40°
41°
42°
43°
44°
45°

Figure 13. Mean annual temperatures in Minnesota.[7]
(After Purssell)

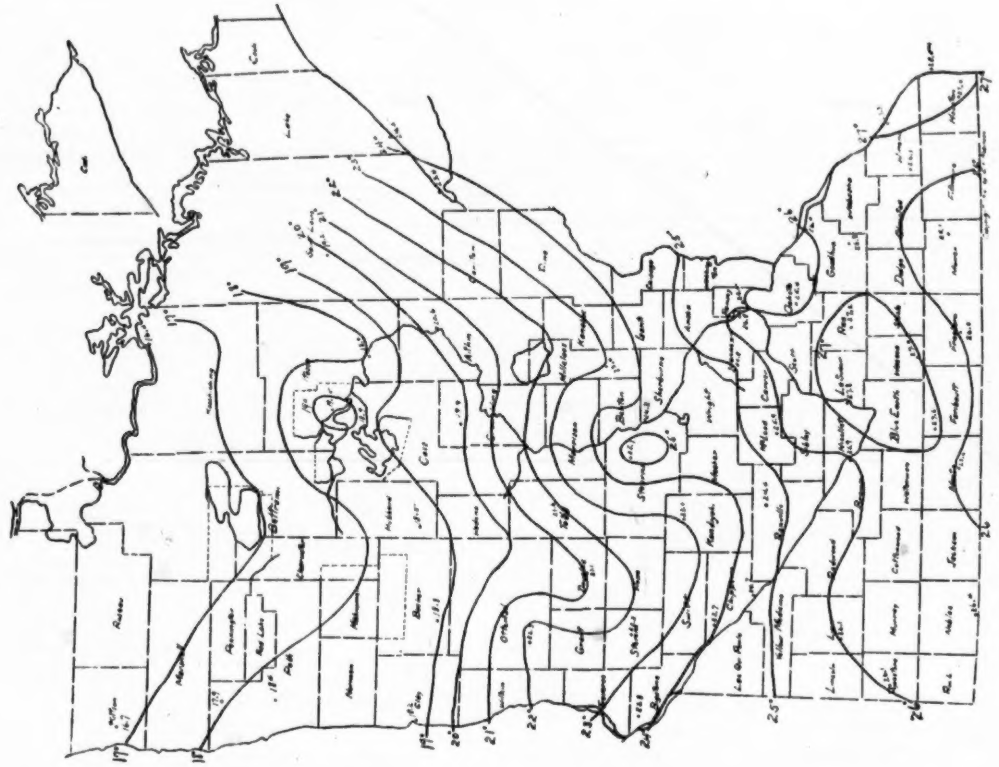
17°
18°
19°
20°
21°
22°
23°
24°
25°
26°
27°

Figure 14. Mean temperatures from October to March.[7]
(After Purssell)

---

[7] Based on figures furnished by the U. S. Weather Bureau at Minneapolis. Figures are degrees Fahrenheit.

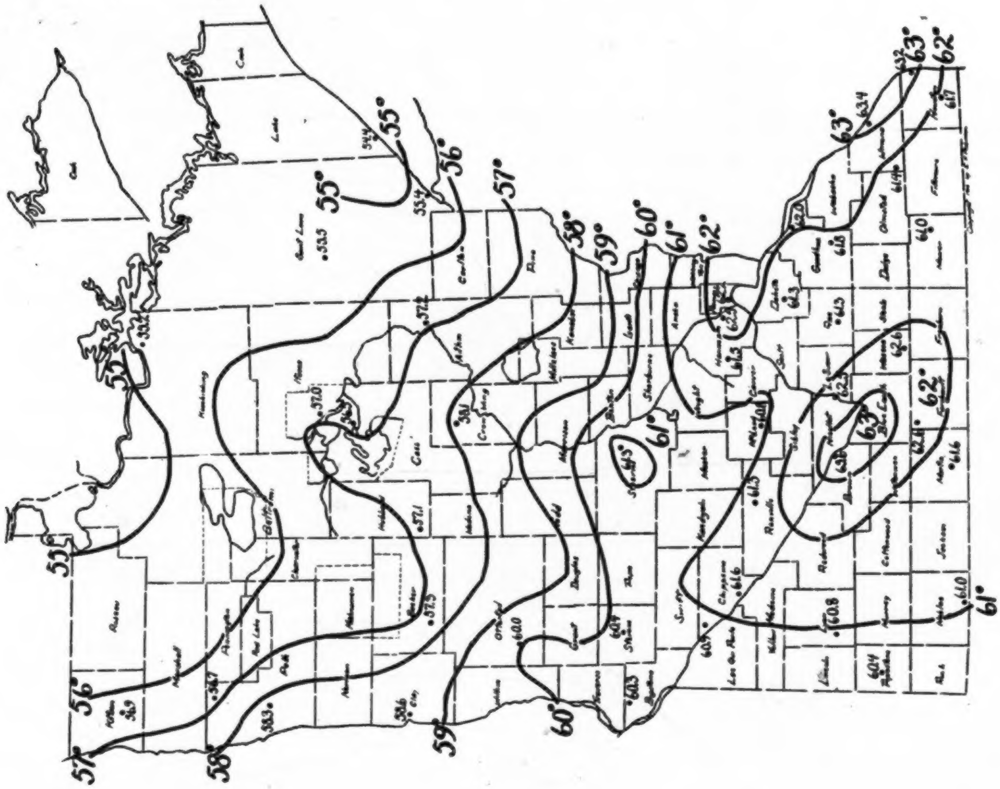
53°
55°
56°
57°
58°
59°
60°
61°
62°
63°

Figure 15. Mean temperatures from April to September.[7]

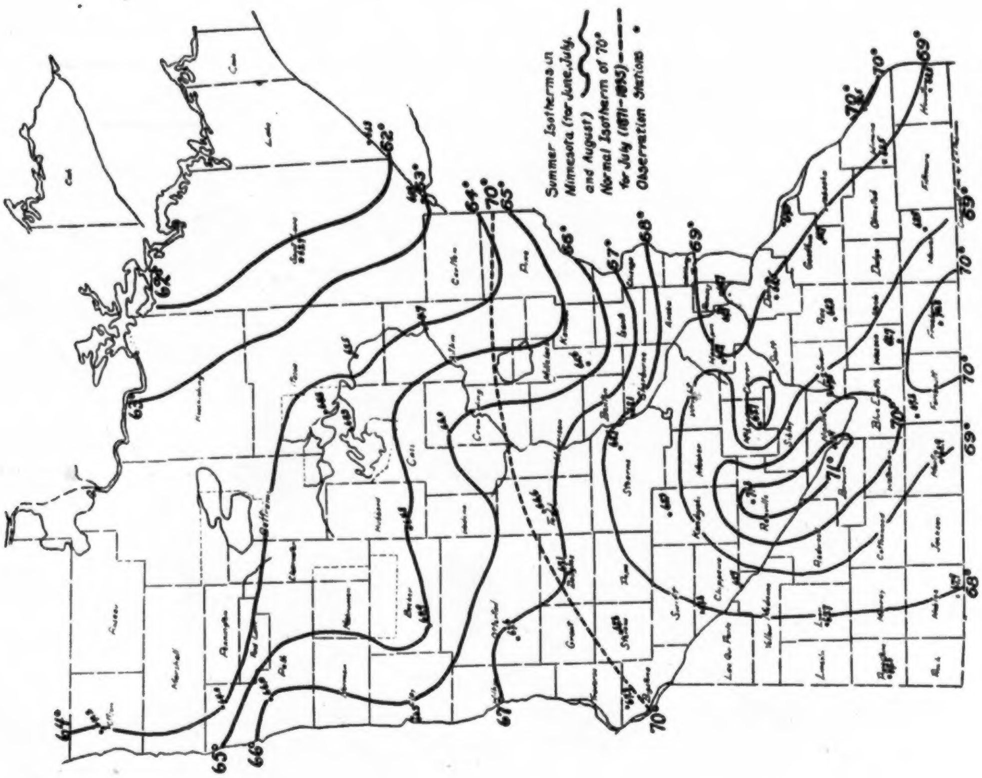
Summer Isotherms in Minnesota (for June, July, and August)
Normal Isotherm of 70° for July (1871-1895)
Observation Stations •
62°
63°
64°
65°
66°
67°
68°
69°
70°
71°
72°

Figure 16. Mean temperatures for June, July, and August; with isotherm of 70° F. (dotted line) for July.[7] (After Pursell)

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[7] Based on figures furnished by the U. S. Weather Bureau at Minneapolis. Figures are degrees Fahrenheit.

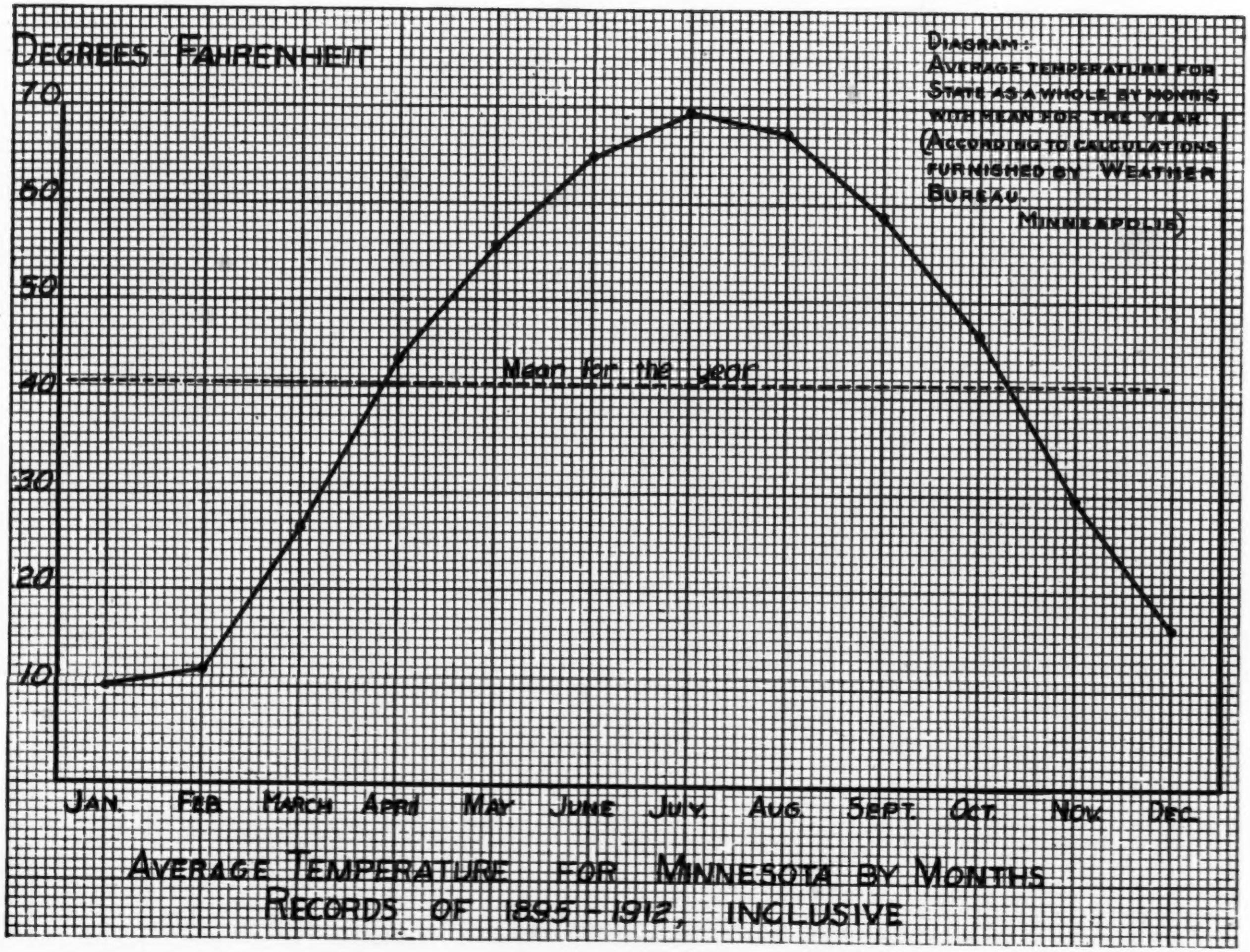

Figure 17. Average temperature for Minnesota by months, 1895-1912.[8]
(Data from Weather Bureau at Minneapolis)

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[8] MEAN MONTHLY TEMPERATURE IN MINNESOTA

(Average of all stations reporting. Period April, 1895 to July, 1913, inclusive.)

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
10.1	11.7	26.5	43.9	55.2	64.7	69.1	67.1	58.8	46.6	29.6	16.2	41.6

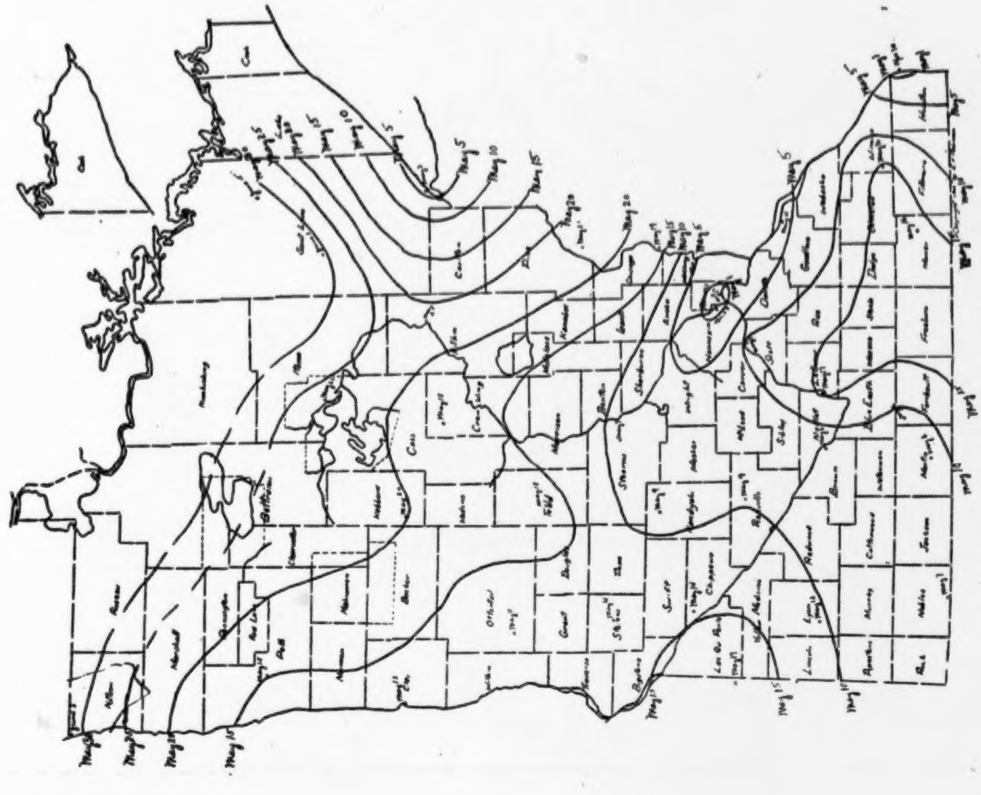

Figure 18. Average dates of last killing frosts in spring.
(After Purssell)

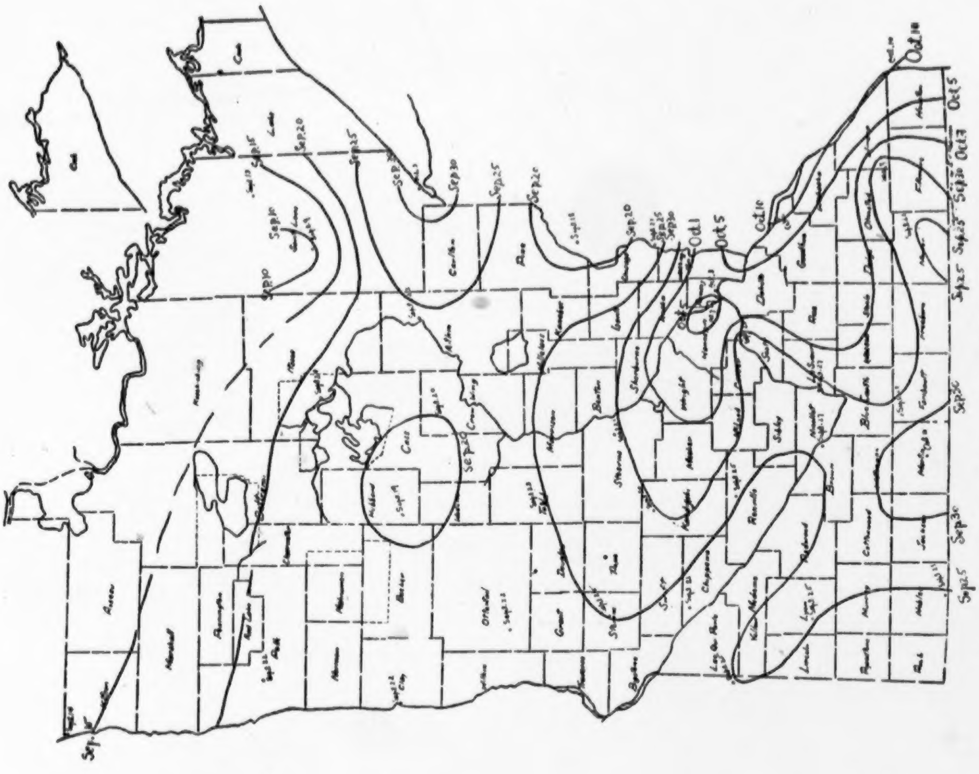

Figure 19. Average dates of first killing frosts in autumn.
(After Purssell)

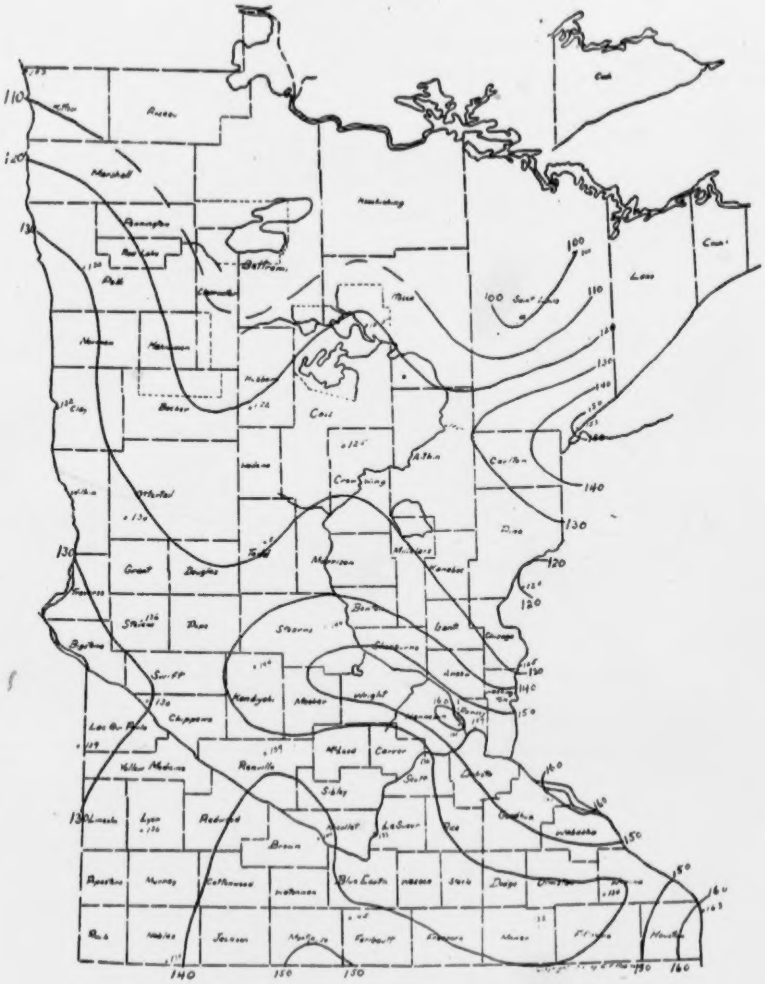

Figure 20. Average length of growing season in days. (After Purssell)

Areas of high and low pressure

In common with the rest of the country, but to a greater extent than regions nearer the ocean, the variations both of temperature and of precipitation are connected with the passage from west to east of areas of low pressure followed by other areas of high atmospheric pressure. Since the winds blow toward areas of low pressure and away from areas of high pressure, the surface winds are constantly veering. On the whole, however, southwest winds predominate in summer; while in winter when the areas of low pressure often pass farther to the south, northwest winds are more frequent. The clear and cool wind from the northwest is refreshing in summer after the close, moist condition of the atmosphere which marks the passage of an area of low pressure; but in winter a wind from the northwest is apt to bring a cold wave. The occurrence of a few clear, dry days each winter with the temperature about 20° F. below zero, as a result of such conditions, has in the past somewhat limited the fruitgrowing industry of the State, pending the development of hardy varieties.

Annual and seasonal temperatures

The average annual temperature for the State as a whole is subject to considerable variation. From 1886 to 1912 it has once (in 1888) fallen below 39 degrees F., and three times (in 1894, 1900, and 1908) it has gone above 43 degrees F. For the entire twenty-seven year period, the average temperature has been 41.4 degrees F. (Fig. 12); for the period April, 1895, to July, 1913, 41.6 degrees F. The latter record is presumably the more reliable, as it represents a much greater number of stations.

A map showing the mean annual temperatures of different parts of the State indicates that the highest annual temperature is a fraction over 45 degrees F., in the Mississippi Valley toward the Iowa line, and also in the relatively low lands south of the elbow of the Minnesota River; while the lowest annual temperature is 36 degrees F., in the extreme north of the State. In general, it is noticeable that the isothermal lines bend to the north, indicating higher temperatures, in all important valleys, and also near Lake Superior. On the other hand, all considerable elevations are marked by a southward dip showing lower temperatures.

During the months from October to March inclusive, the average temperature varies from 27 degrees F. in the southeastern corner and in the elbow district previously mentioned, to 17 degrees F. along the northern border—a range of 10 degrees (Fig. 14).

In this latitude, however, where most crops are planted in the spring and harvested in the autumn, less importance attaches to the winter temperatures, or even to the annual isotherms, than to the heat of the growing season. During this season, from April to September, inclusive, the highest average temperature is 63 degrees F., in the southeast and in the Minnesota elbow region; while the lowest is 55 degrees F., near the Lake of the Woods and also near Lake Superior. The extreme range in the growing season, from south to north, is thus 8 degrees F. The northward bend of the isotherms in the valleys is even more pronounced than on the map of annual temperatures (Fig. 13). Still more significant than the isotherms for the entire growing season are the temperatures for the three summer months, which have a special relation to the ripening of grain; while for certain crops the isotherm of 70 degrees F. for the warmest month is thought important (Figs. 15, 16).

For the State as a whole, a chart showing the average temperature by months brings sharply to view the considerable range between the winter and the growing seasons, resulting from the midcontinental location of the State in middle latitudes (Fig. 17). It is this high temperature in summer and the lingering of heat in the autumn, shown by the more gradual slope on the right, which render summer farming so independent of winter temperatures.

Length of growing season

More important in some respects than the temperature is the length of the growing season, between the last spring and first autumn frosts. The average date of the last killing frost in the spring varies from May 1, in the southeast, to May 30, in the extreme north (Fig. 18). There is a curious island of frost immunity around Minneapolis and St. Paul. Several other maps have shown an island of higher temperature in that locality, for which no convincing explanation has been advanced; though some investigations of climate in great cities have sought to show a change of temperature due to the artificial heat generated there. Possibly the blanket of smoke, checking radiation, may have some effect. It is worthy of note that, owing to the moderating effect of Lake Superior, killing frosts do not occur later in the spring at Duluth than at Winona. This relative immunity also extends back in all directions a considerable distance from the lake.

The average date of the first killing frost in autumn is September 10, on the iron ranges, and October 10, in the southeastern lowlands. The range in this case, as in the date of the last spring frost, is thus a month. The same relative immunity to frosts is found around Lake Superior and about the Twin Cities, as on the map of spring frosts (Fig. 19). Considerable irregularity develops in the southern part of the State, due to the early frosts on the higher uplands; and also in parts of the Minnesota Valley, which acts as a catch basin for the cold air from the lower adjacent hills.

The average length of the growing season, representing the interval between the dates shown on the last two maps, necessarily partakes of all the peculiarities there indicated. The growing season varies from one hundred sixty days in the southeast and around the Twin Cities, to one hundred days on the iron ranges—an extreme range of substantially two months. This range is sufficient to introduce very considerable differences in the crop systems of the several parts of the State. The map brings out in a striking manner the influence of elevation in shortening, and proximity to large bodies of water in lengthening, the growing season. Thus the absence of late spring and early fall frosts in the vicinity of Lake Superior gives a growing season nearly ten days longer than the average in the State. This fact suggests that the south-facing slope north of Lake Superior, as far as formerly flooded by the lake, may not improbably become the seat of intensive culture of hardy fruits and vegetables, provided they do not require high summer temperatures. The cheapness of transportation by water to large and growing urban populations affords additional advantages, as in the case of the eastern shore of Lake Michigan.

For the State as a whole, the average growing season, from 1898 to 1912, has been 132.2 days: the longest being 145 days, in 1905; the shortest, 118 days, in 1907. The extreme range in average length of growing season for the entire State from 1898 to 1912 has thus been twenty-seven days or approximately a month.

Annual and seasonal precipitation

The rainfall in Minnesota, as in most of the region east of the Rocky Mountains, is of the summer or semi-monsoon type. The moisture-laden air from the south and east, pressing inward toward the heated interior of the continent, is drawn into the areas of low pressure, where it is chilled in the process of rising and drops a part of its moisture in the form of rain. There is also some precipitation from local thunder storms, not connected with the eastward movement of large areas of low pressure.

The average annual precipitation for Minnesota from 1886 to 1912 inclusive, was 26.52 inches; for 1895-1912 it was 27.16 inches. If the figures be limited to stations having a record of 10 years, the average is 26.9; and if the figures be weighted in proportion to the areas represented, the resulting weighted average is 26.86 inches.[9] From 1886 to 1896, the average was below normal in every year but one; from 1896 to 1906, on the other hand, the average precipitation was above normal in every year but two; in 1907, again, began a period of sharp fluctuation, 1910 being by 30 per cent the driest year on record. As in the case of temperature, so in the matter of rainfall, the annual amount is less important than its distribution throughout the year.

According to these figures, 20.37 inches, or exactly 75 per cent of the total, fell during the growing season, from April to September inclusive. The rainfall during that period is thus equal to the amount for the same months in northern Illinois, Indiana, Ohio, Pennsylvania, and New York, though the yearly average in all these districts is considerably greater than in Minnesota. Moreover, evaporation, while not yet accurately measured except for water surfaces, tends to vary directly with temperature and is therefore less rapid in Minnesota than in regions farther south (Fig. 24). For both of these reasons, a rainfall of 27 inches in Minnesota is equal, in crop-producing power, to 40 or even 50 inches at other seasons or in lower latitudes.

The average annual precipitation is greatest (34 inches) in the southeast, and least in the northern Red River Valley. In that region, however, as much as 77 per cent of the precipitation occurs in the growing season. The effect of Lake Superior is clearly seen in the relatively heavy precipitation along its northern shore.

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[9] Based on figures furnished by the U. S. Weather Bureau at Minneapolis

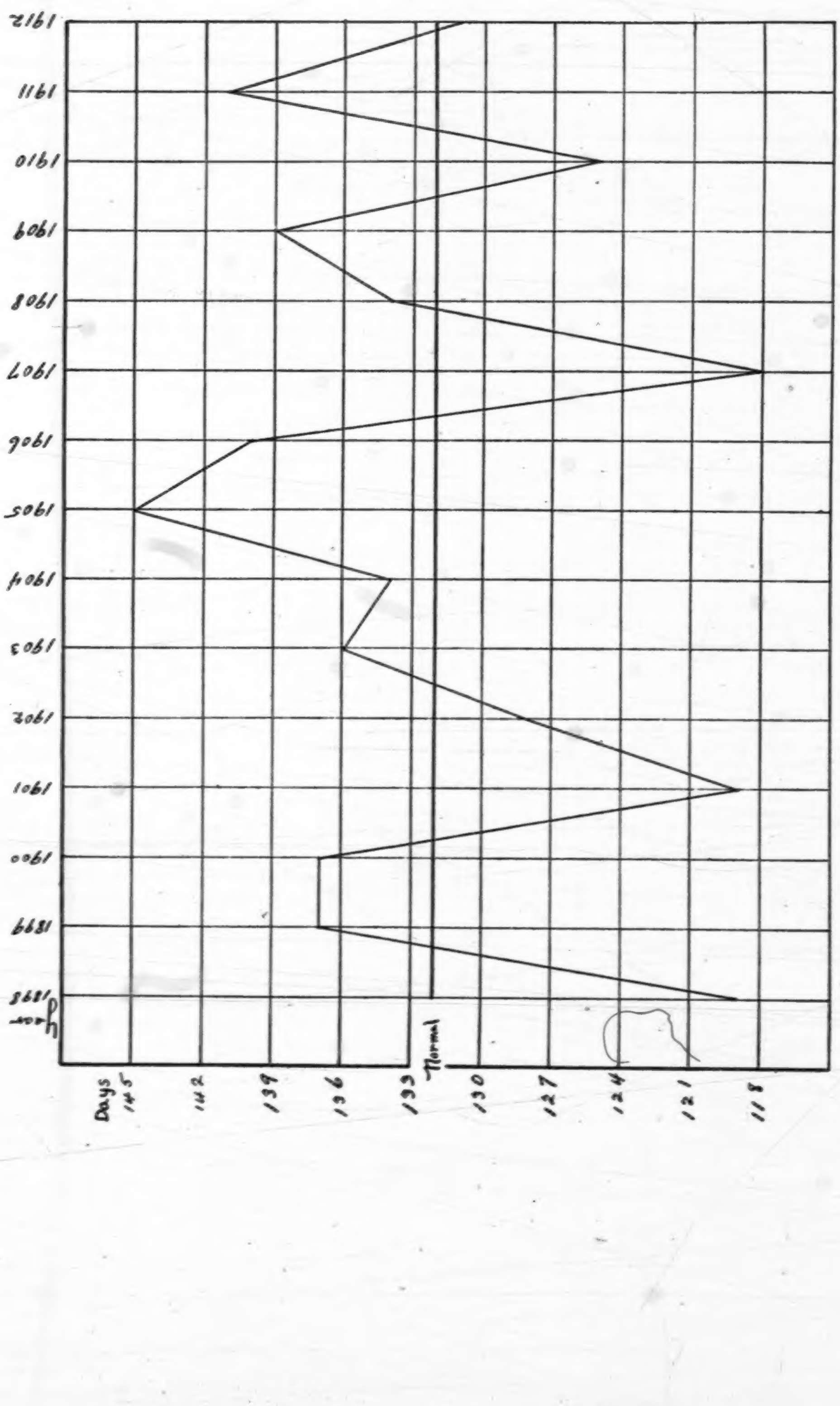

Figure 21. Variations in average length of growing season in Minnesota, 1898-1912.

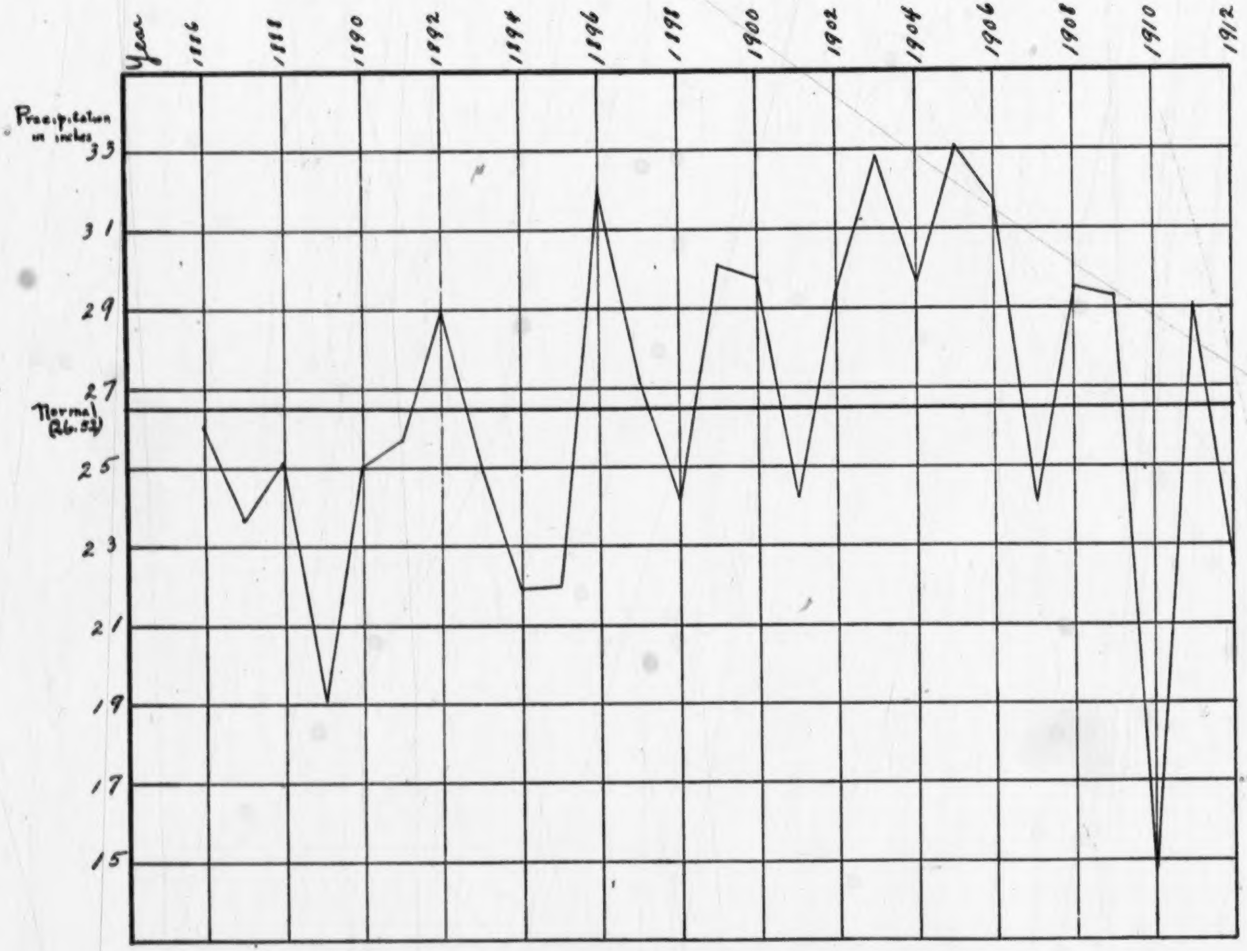

Figure 22. Average annual precipitation in Minnesota by years from 1886 to 1912 inclusive.[9]

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[9] Based on figures furnished by the U. S. Weather Bureau at Minneapolis.

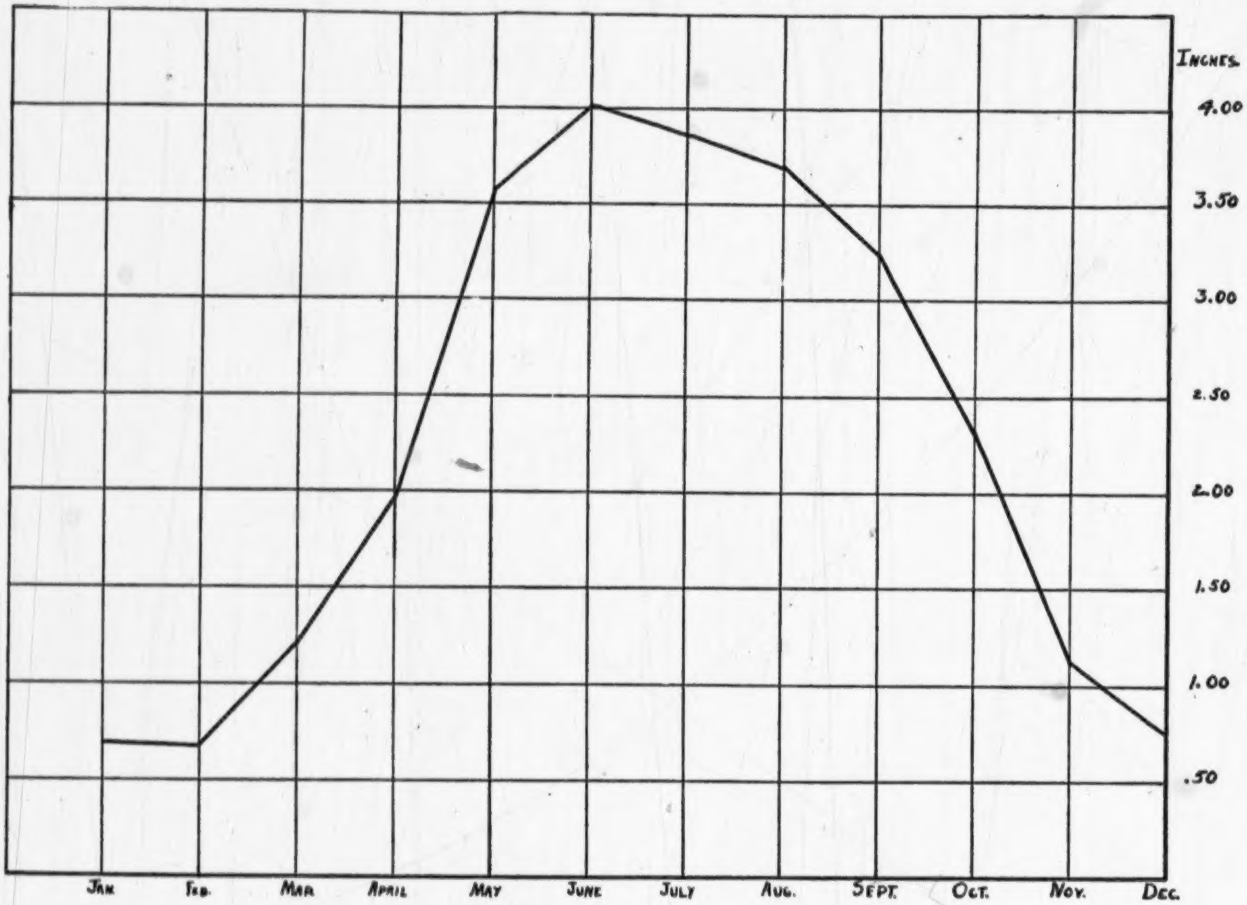

Figure 23. Average precipitation in Minnesota by months, May, 1895 to July, 1913. (Data from Weather Bureau)[10]

[10] AVERAGE PRECIPITATION FOR MINNESOTA

As determined from the records of all stations reporting for the period from May, 1895 to July, 1913, inclusive. (Data from Weather Bureau at Minneapolis.)

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
0.69	0.67	1.22	1.98	3.59	4.01	3.86	3.69	3.24	2.31	1.14	0.76	27.16

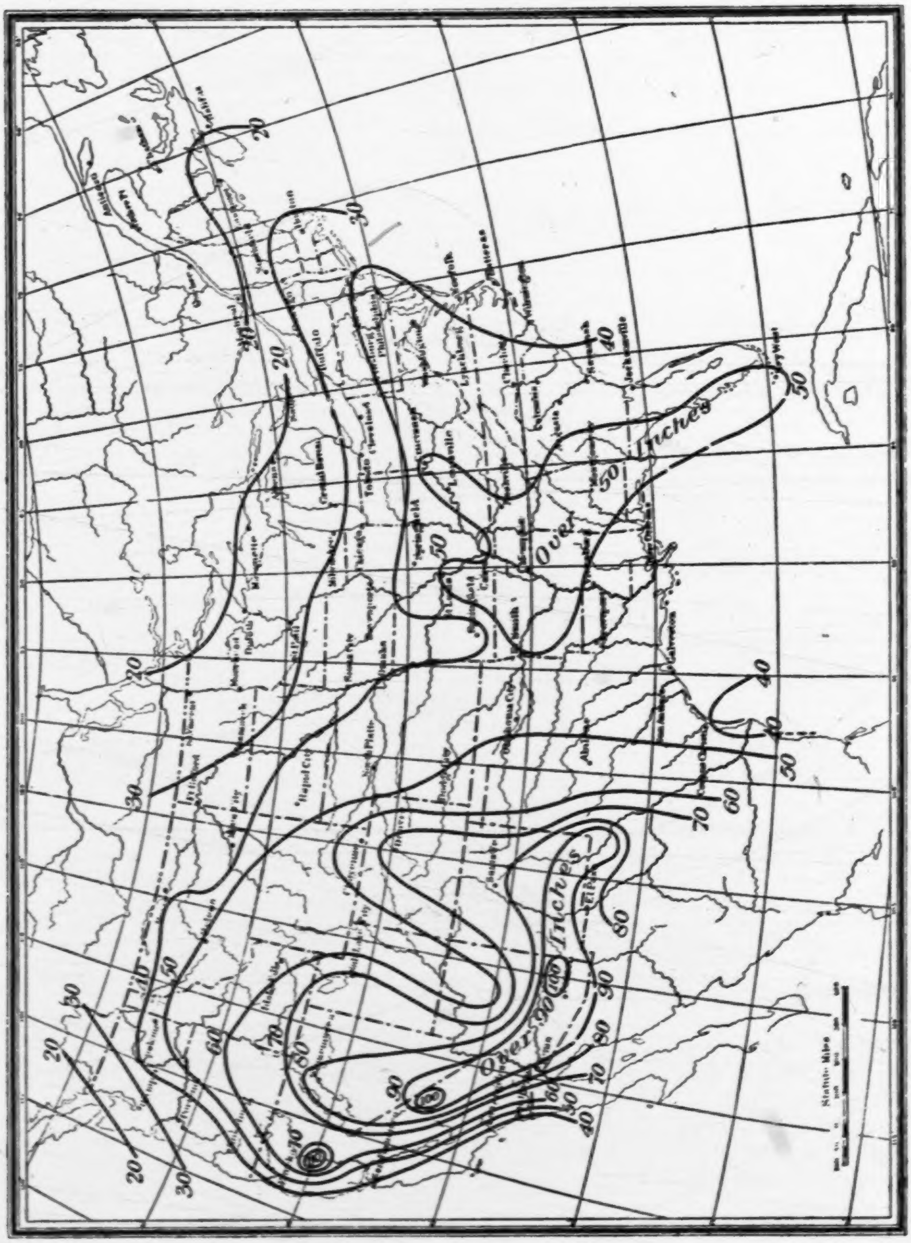
Over 90 Inches
Over 50 Inches
20
30
40
50
60
70
80
90
100
Statute Miles

Figure 24. Annual depth of evaporation in inches from a free water surface. (Monthly Weather Review, Dec., 1904, 558)

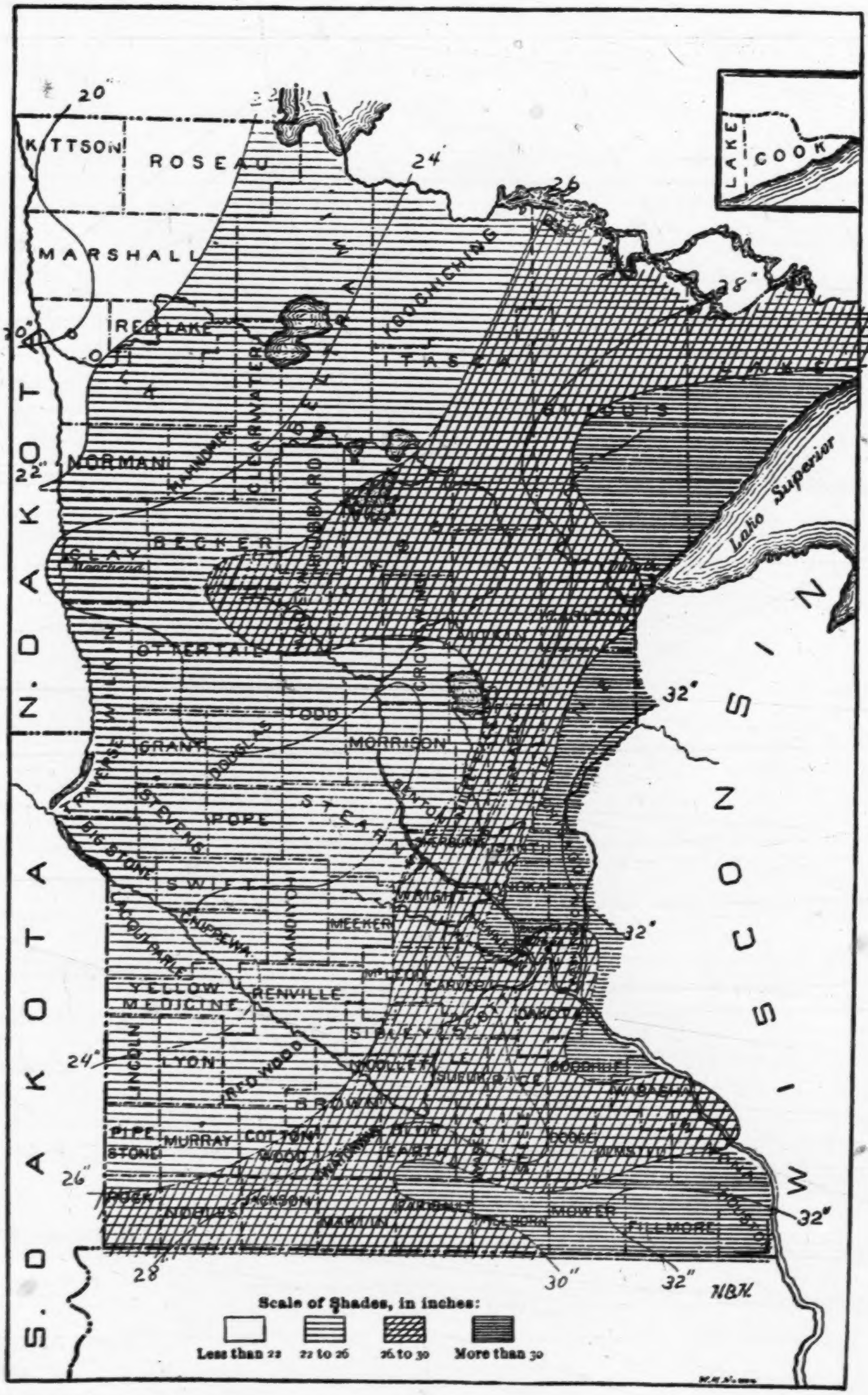
20"
22"
24"
26
28"
30"
32"
KITTSON
ROSEAU
MARSHALL
RED LAKE
POLK
NORMAN
MAHNOMEN
CLEARWATER
BELTRAMI
KOOCHICHING
ITASCA
ST. LOUIS
LAKE
COOK
Lake Superior
HUBBARD
CLAY
Moorhead
BECKER
WILKIN
OTTERTAIL
TODD
MORRISON
CROW WING
AITKIN
CARLTON
PINE
GRANT
DOUGLAS
TRAVERSE
BIG STONE
STEVENS
POPE
STEARNS
BENTON
SHERBURNE
ISANTI
CHISAGO
ANOKA
WRIGHT
SWIFT
KANDIYOHI
MEEKER
CHIPPEWA
LAC QUI PARLE
YELLOW MEDICINE
RENVILLE
McLEOD
CARVER
DAKOTA
SIBLEY
SCOTT
LINCOLN
LYON
REDWOOD
BROWN
NICOLLET
LE SUEUR
RICE
GOODHUE
WABASHA
PIPESTONE
MURRAY
COTTONWOOD
WATONWAN
BLUE EARTH
WASECA
STEELE
DODGE
OLMSTED
WINONA
ROCK
NOBLES
JACKSON
MARTIN
FARIBAULT
FREEBORN
MOWER
FILLMORE
HOUSTON
N. DAKOTA
S. DAKOTA
WISCONSIN
NBK
Scale of Shades, in inches:
Less than 22
22 to 26
26 to 30
More than 30

Figure 25. Distribution of average annual precipitation for Minnesota by regions. (Weather Bureau)

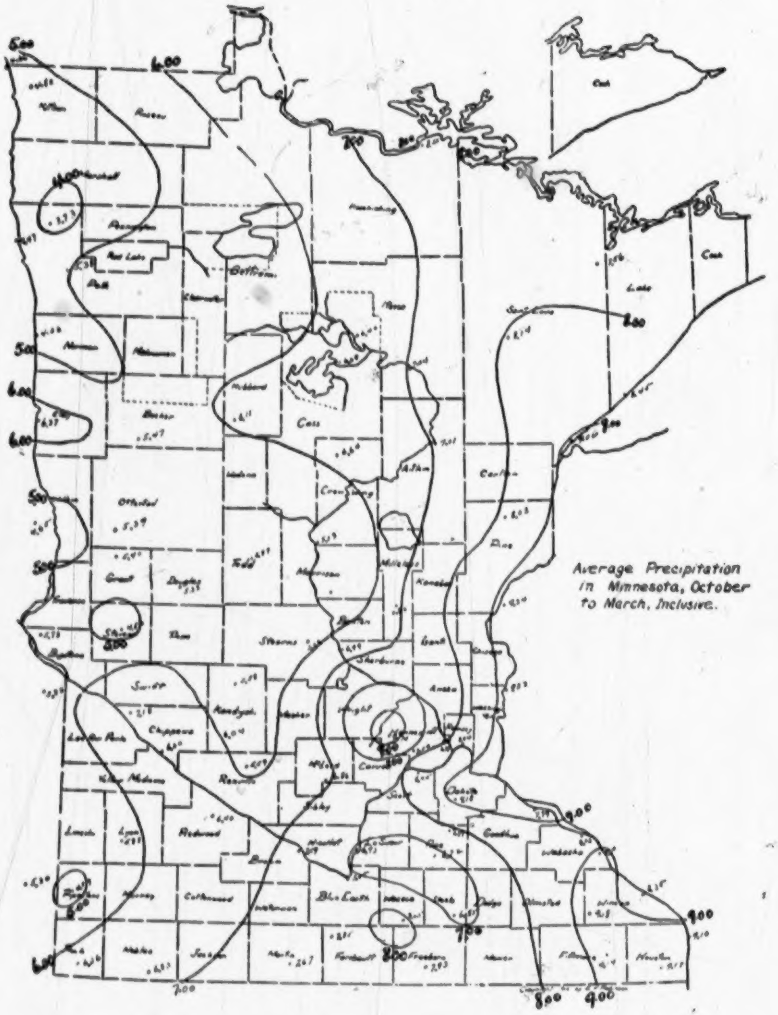
Average Precipitation
in Minnesota, October
to March, Inclusive.
5.00
6.00
7.00
8.00
9.00

Figure 26. Average precipitation in Minnesota, October to March, inclusive. (After Purssell)

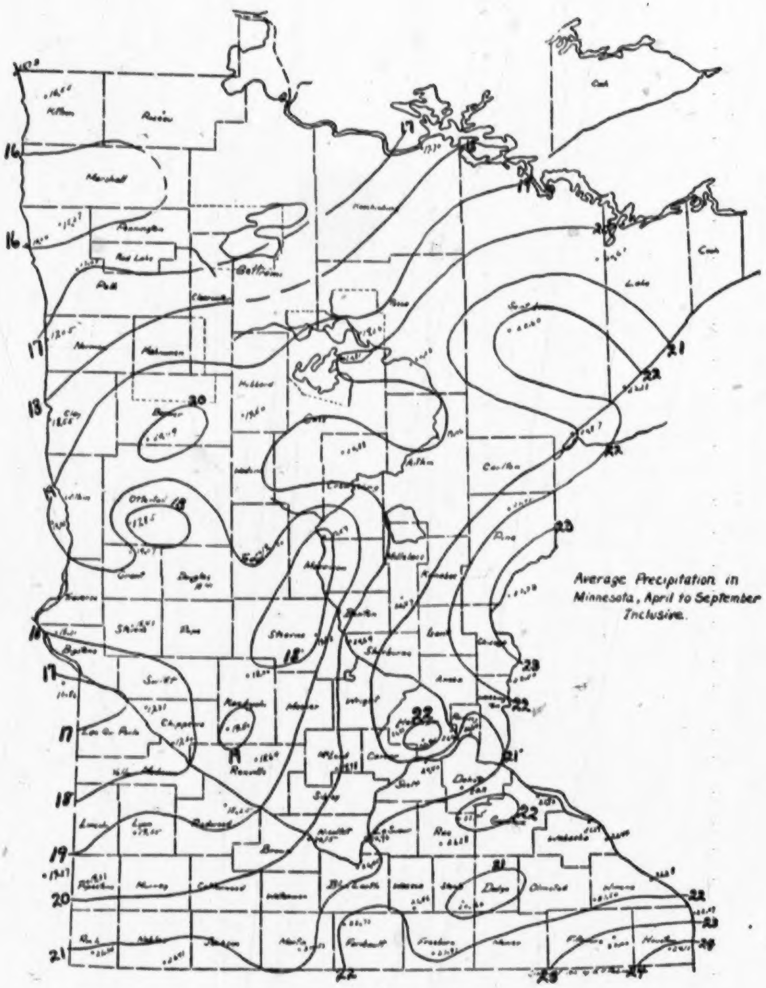
Average Precipitation in
Minnesota, April to September
Inclusive.
16
17
18
19
20
21
22
23
24

Figure 27. Average precipitation in Minnesota, April to September, inclusive. (After Purssell)

In like manner the precipitation during the growing season varies from 24 inches in the southeast to 16 inches in part of the Red River Valley (Fig. 27); while during the winter (October-March) the precipitation runs from nine inches in the southeastern corner and along the eastern edge of the State to five inches in the northwest. The relatively light snowfall is a factor in limiting certain fall-sown crops which need the protection afforded by a mantle of snow; but the amount which does fall is more effective than it is farther south, owing to the infrequency of thaws. For this reason fall-sown grains have been migrating northward for a number of years.

Soil and climate together determine the types of native vegetation. The joint effect of all the factors hitherto discussed is consequently shown, in a general way, by a "life zones" map; and this has the further advantage of showing the relation of the climatic zones in Minnesota to those of neighboring states.

It is worthy of note how all the life zones bend toward the north in the Great Plains region. This shifting of the zones, moreover, is strikingly illustrated in the western part of Minnesota. This fact largely explains the great development of wheat-growing in the Red River Valley, in a latitude where, on the Atlantic slope, little or no wheat is grown.

CHAPTER II

EARLY TRAVEL, TRADE, AND TRANSPORTATION

The French period

The first white men in Minnesota were Frenchmen who entered by way of the Great Lakes, and their motive was the fur trade. According to Radisson's account, Groseilliers and Radisson were possibly on the Mississippi above Hastings, in 1655, though this interpretation is uncertain; and were again somewhere in eastern Minnesota in 1659.[1] Just twenty years later, Du Lhut reached Mille Lacs from Lake Superior. The next year he came over the Bois Brulé-St. Croix route (Fig. 28) to the Mississippi, joining there Father Hennepin, who had just discovered and named the Falls of St. Anthony.[2] A few years later Perrot, coming by way of the Fox-Wisconsin route (Fig. 31), built a fort on the Mississippi. In 1793, after the revolt of the Fox Indians had closed this thoroughfare, Le Sueur came out by the Bois Brulé-St. Croix portage and established a trading post on Prairie Island below Hastings.[3] Having learned, as he believed, of the existence of copper on a tributary of the Minnesota, Le Sueur later returned to France, came out with the party which settled New Orleans, ascended the river, built a fort on the Blue Earth River, and secured there a cargo of bluish-green earth which he mistook for copper (1700).[4] In the first half of the eighteenth century, after an interval of withdrawal, there were again French forts and garrisons in Minnesota, both on Pigeon River, north of Lake Superior, and on the Mississippi near Frontenac.[5]

The French régime formally ended with the cession of the country west of the Mississippi to Spain, in 1762; and that east of the Mississippi to England, in 1763. There remained in Minnesota only a few French traders and a considerable number of half-breeds who generally intermarried again with Indians. The half-breed element was thus in rapid process of absorption by the Indian stock. Because of the dominance of the fur trade and the consequent wide scattering of the whites, there was no agriculture as a separate occupation, and no permanent settlement of French origin within the limits of Minnesota.

The English period

In 1766 appeared the first of the English explorers, Captain Jonathan Carver, who came out by the Fox-Wisconsin route and ascended the Minnesota River in search of a route to the Pacific.[6] The English also took up the fur trade with renewed vigor; and in the year of Carver's visit, ten years before the Declaration of Independence, there was at certain seasons a considerable rendezvous at Grand Portage,[7] some five miles west of the present international boundary on Lake Superior, where the canoe route started for Lake Winnipeg and beyond (Fig. 28). In these circumstances the monopoly claimed by the Hudson Bay Company, under a charter dating back to 1670, provoked resistance; and during the winter of 1783-1784 the Northwest Company was formed at Montreal, though it was not completely organized till 1787. The new company operated along the St. Lawrence and Great Lakes route, with its chief posts at Detroit, Mackinaw, La Pointe (near Ashland), Prairie du Chien, and Fond du Lac (Minnesota). From these stations it long continued, in spite of the American Revolution, to be the real government in the Northwest. A much-used route led up the St. Louis and East Savanna rivers over a portage[8] to the Prairie River and so to Sandy Lake and the Mississippi. This portage follows the former course of the upper St. Louis River when it flowed into the Mississippi. Owing to its strategic location, the chief factor of the Northwest Company at Fond du Lac and later (after 1794) at Sandy Lake, controlling the trade over this route, practically ruled all northern Minnesota. In 1805 Lieutenant Zebulon Montgomery Pike, of the American army, found the British flag still flying over the Northwest Company's posts in Minnesota;[9] and this condition only ceased in 1816, when Astor induced Congress to pass an act confining the Indian trade to American citizens.

The fur trade under the American régime

As a result of this law all posts south of the Canadian boundary eventually passed into the control of the American Fur Company. In 1821 the Northwest Company, thus driven to the wall, merged with the Hudson Bay Company. Meantime, Fort Crawford was built at Prairie du Chien in 1816, and in 1819 Fort Snelling was established on a high bluff commanding the junction of the Mississippi and Minnesota rivers.

Henceforth, the flag was different; but for almost another generation the old mode of life went on practically unchanged. Hunting, fishing, and the fur trade rather than farming continued to be the economic basis of life, and as a consequence the white population remained small and widely scattered. To a considerable extent, indeed, the French element, recruited from Canada where the French began to increase as they had never done under French rule, continued to predominate on the frontier. Thus J. B. Faribault, who settled for a time at Prairie du Chien and was almost the only trader unwilling to bear arms for England in 1812, subsequently established the first trading post at St. Peters (Mendota). His son, Alexander Faribault, in 1826 built a trading post on Cannon Lake, near the headwaters of Cannon River; and later (1844) transferred this post to the site of the city which now bears his name.[10] In like manner Joseph Renville, a half-breed who had fought against the United States in the War of 1812 and subsequently (1822) organized the short-lived Columbia Fur Company, in 1835 established a noted trading post on Lac qui Parle where he represented the American Fur Company.[11] In 1834, however, Henry H. Sibley settled at Mendota as a chief factor of the American Fur Company,[12] and for almost twenty years he remained easily the most powerful man in Minnesota, practically ruling a vast territory like a feudal lord. In 1843 Norman W. Kittson established a trading post at Pembina in the Red River Valley and later became the representative there of the Hudson Bay Company.[13] Other fur traders prominent in the early history of Minnesota were Joseph R. Brown, a drummer boy in the first detachment that came to Fort Snelling, who married a squaw and had trading posts at various points in the State;[14] William Morrison, who claimed to have found his way to Lake Itasca as early as 1804;[15] Allan Morrison, of Crow Wing; Ramsey Crooks, first agent in the northwest of the American Fur Company; Charles H. Oakes and Charles W. Borup, of La Pointe and (after 1849) of St. Paul. Henry M. Rice also came to Minnesota representing the Chouteau fur interests of St. Louis, at first the rival, then the successor, of the American Fur Company.[16] The intensely bitter campaign of 1850, which ended in Sibley's return to Congress as territorial delegate, resulted from this clash of business interests as well as the personal rivalry between Rice and Sibley.[16]

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[1] Radisson, *Voyages* (*Prince Society Publications*, 1885). See also Folwell, W. W., *History of Minnesota*, 9.

[2] Hennepin, Louis, *Description de la Louisiane nouvellement découverte, etc.* (1683); and *Journeys of La Salle and His Companions*, ed. by I. J. Cox (Trail Makers Series, New York, 1903-1905); in *Minn. Hist. Soc. Coll.* I, 17, 302, 314. On the St. Croix-Bois Brulé route, see Appendix to Shea's edition of Hennepin's *Louisiane*, 375.

[3] *Early Voyages up and down the Mississippi*, ed. by Shea (Albany 1861); in *Wis. Hist. Coll.* XVI, 149; *Minn. Hist. Soc. Coll.* II, 89, 200.

[4] *Wis. Hist. Coll.* XVI, 177-200; *Minn. Hist. Soc. Coll.* I, 17, 319; III, 1-12.

[5] *Jesuit Relations*, LV, 320; LXVI, 337.

[6] Carver, Jonathan, *Travels, etc.* (London 1781); in *Minn. Hist. Soc. Coll.* I, 349.

[7] *Minn. Hist. Soc. Coll.* IX, 9.

[8] Schoolcraft, H. R., *Narrative Journal of Travels . . . . in 1820* (Albany 1821), 209, 274.

[9] Pike, Zebulon, *Exploration of the Sources of the Mississippi* (Baltimore 1810); also *Exploratory Travels, etc* (London 1811); in *Minn. Hist. Soc. Coll.* I, 3 .

[10] *Minn. Hist. Soc. Coll.* III, 168; *Soil Survey of Rice County*, Bureau of Soils, Dept. of Agr.

American explorers and missionaries

The first important American explorer was Zebulon Pike, already mentioned, who set out from St. Louis in September, 1805 to explore the headwaters of the Mississippi.[17] He had twenty soldiers and ascended the river in a seventy-foot keel boat, propelled by oars and poles. After buying from the Indians a tract of land for a military reservation at the junction of the St. Croix and Mississippi, and another at the junction of the Minnesota and Mississippi, he portaged around St. Anthony Falls, proceeded up the river to the rapids below Little Falls, and then during the winter traveled by sled to Sandy Lake, Leech Lake, and Upper Cedar (Cass) Lake, which he believed to be the true source of the Mississippi. In 1820 Governor Cass, of Michigan, came up the Lakes and over the Savanna portage to Cass Lake, which he also reported as the source of the Mississippi.[18] In 1823 Major Long ascended the Minnesota, portaged to the Red River, and returned by way of Rainy River and Lake Superior.[19] An Italian named Beltrami, who had accompanied him part way, set out by way of Red Lake to find the source of the Mississippi. Going up a tributary of Red Lake, he portaged to Lake Julia, some six miles north of Lake Bemidji, which he apparently believed to be the true source both of the Red River and of the Mississippi.[20] In 1832 Henry R. Schoolcraft, who had accompanied Governor Cass in 1820, again came over the Savanna portage and finally reached a lake which he named Itasca.[21] In 1836 Joseph N. Nicollet, following up one of several creeks flowing into Lake Itasca, found three smaller lakes, the last of which he claimed to be the final source of the great river.[22]

In the meantime Protestant missionaries had appeared on the scene, the first at Leech Lake in 1833, among the Chippeways; the second in 1834 among the Sioux on the shore of Lake Calhoun, now included in Minneapolis. These pioneers were followed by numerous others in both the Chippeway and the Sioux territories.[23] It may be doubted whether either explorers or missionaries contributed directly to the development of agriculture; though the missionaries did try to teach the Indians how to farm, and there was a time, in the early fifties, when the Indians in some districts probably grew more corn than the whites.[24] However this may have been, there can be no doubt that the reports both of explorers and missionaries spread a knowledge of the country and its possibilities and thus indirectly prepared the way for the great immigration a few years later.[25] Such knowledge had not been previously disseminated by the fur traders, who did not want agricultural settlers, since their presence would tend to destroy the wilderness conditions necessary for the continued prosperity of the fur trade.

Early transportation routes by water

Until superseded by railroads, the principal routes remained substantially what they had been during the French and English periods; and most travel and trade went by water.

Between the Mississippi and the Red River the principal water route led up the Minnesota and over the portage at Browns Valley from Big Stone Lake into Lake Traverse.[26] Another went by way of the Crow Wing and Leaf rivers over a portage into Otter Tail Lake, this portage being the site of the former village of Ottertail. A third route led from Cass to Red Lake by way of Turtle and Red Lake rivers, going through the Lake Julia discovered by Beltrami.[28] From the Mississippi to Rainy River the usual course was from Lake Winnibigoshish into Big Fork River, over a mile portage connecting Cut-Foot-Sioux Lake, an affluent of Winnibigoshish, with Bowstring Lake.[27] From the Mississippi to Lake Superior there were two routes: the first connecting Sandy Lake and the St. Louis River by way of the Savanna portage as previously described; the second going through Wisconsin by way of the St. Croix and the Bois Brulé rivers.[28] Between Lake Superior and Lake Winnipeg the route by way of Grand Portage,[29] Pigeon and Rainy rivers remained in use until about 1812, when the Canadian government shifted the terminus from Grand Portage to Fort William on Canadian soil. At a later period that government also placed ox teams on the portages and steamboats on the lakes, in order more effectively to connect the St. Lawrence with the Winnipeg basin. This route remained in use until supplanted by the Canadian Pacific Railway. The Wisconsin-Fox route also continued to be followed between the Mississippi and Lake Michigan until superseded by the railway.

Canal and lake navigation

When Thomas Jefferson negotiated the Louisiana Purchase, he thought that it would be a thousand years before the region

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[11] *Minn. Hist. Soc. Coll.* I, 196 ff.
[12] *Ibid.*, VI, 267.
[13] Blakeley, Capt. Russell, *The Opening of the Red River of the North to Commerce;* in *Minn. Hist. Soc. Coll.* VIII, and Baker, *ut infra*, 20.
[14] *Minn. Hist. Soc. Coll.* I, 466-470; III, 201.
[15] *Ibid.*, I, 417; III, 247-248.
[16] Baker, J. H., *History of Transportation in Minnesota;* in *Minn. Hist. Soc. Coll.* IX, 13.
[17] Folwell, W. W., *History of Minnesota*, 105-106.
[18] Schoolcraft, H. R., *Narrative Journal of Travels . . . . in 1880* (Albany 1821); in *Minn. Hist. Soc. Coll.* I, 123.
[19] *Ibid.*, I, 124.
[20] Beltrami, G. C., *A Pilgrimage in Europe and America, etc.*, 2 vols. (London 1828); in *Minn. Hist. Soc. Coll.* II, 183.
[21] Schoolcraft, H. R., *Narrative of an Expedition . . . . to Itasca Lake, etc.* (New York 1834); also *Summary Narrative, etc.* (Philadelphia 1855); in *Minn. Hist. Soc. Coll.* I, 125,153.
[22] Nicollet, J. W., *Report Intended to Illustrate a Map of the Hydrographical Basin of the Upper Mississippi River* (Washington 1845); in *Minn. Hist. Soc. Coll.* I, 183.
[23] *Minn. Hist. Soc. Coll.* I, 84, 477; II, 120, 125, 126; VI, 117.
[24] Le Duc, *Minnesota Year Book* (1853), 26; Bond, *Minnesota and Its Resources* (New York 1853), 212-213.
[25] *Minn. Hist. Soc. Coll.* I, 191; III, 251.
[26] *Ibid.*, I, 470.
[27] *Ibid.*, VIII, 237.
[28] *Ibid.*, III, 246; VIII, 238; Appendix to *Journal Minn. House of Representatives*, 1857-1858, 54; Bond, *Minnesota and Its Resources*, 80; ch. III, note 2.
[29] *Minn. Hist. Soc. Coll.* IX, 9; Alex. MacKenzie, *Voyages*, pp. xlvii-xci; Thwaites, *Story of Wisconsin*, p. 132, note.

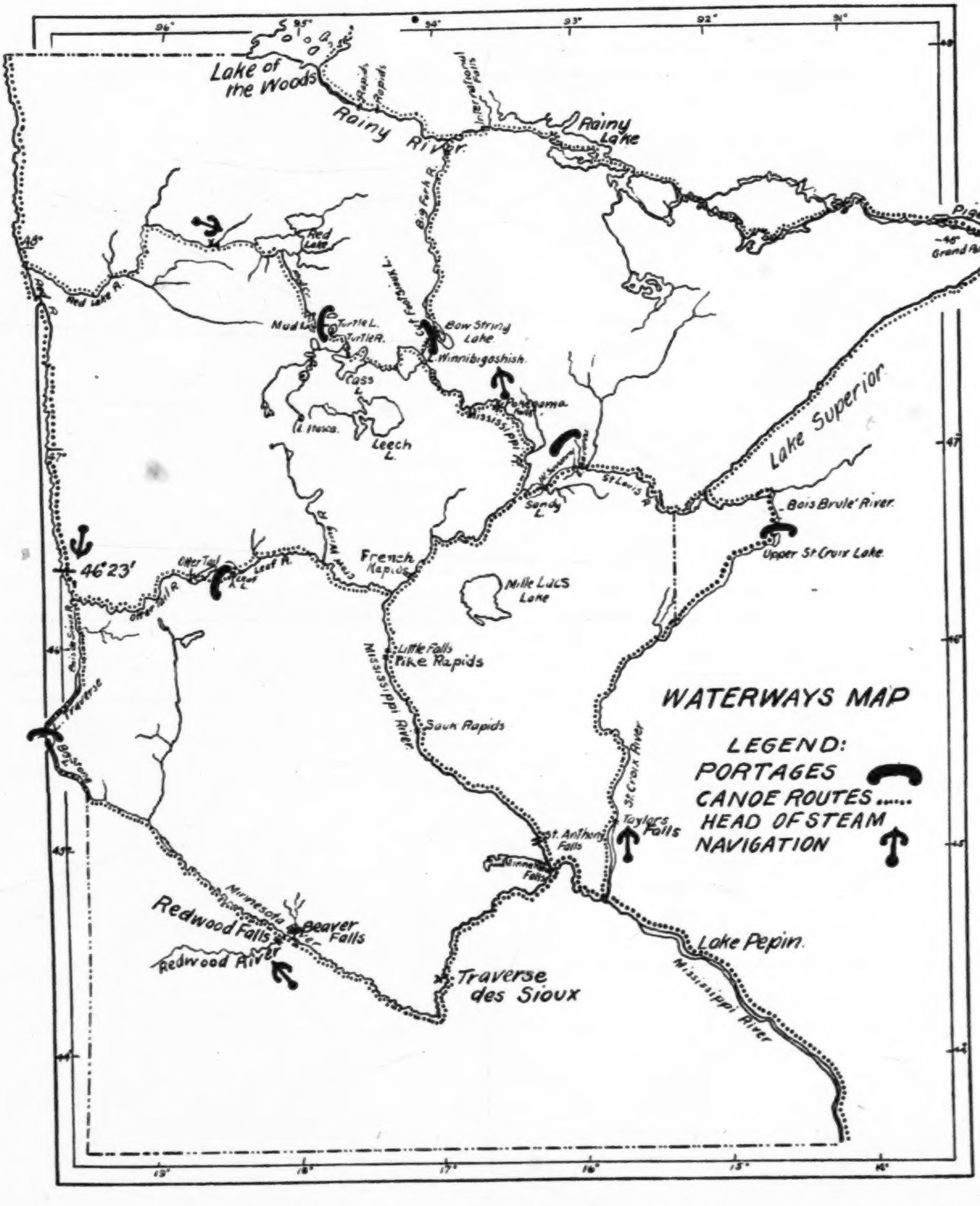
WATERWAYS MAP
LEGEND:
PORTAGES
CANOE ROUTES......
HEAD OF STEAM NAVIGATION
Lake of the Woods
Rainy River
Rainy Lake
International Falls
Rapids
Pigeon R.
Grand Portage
Red Lake
Red Lake R.
Big Fork R.
Mud L.
Turtle L.
Turtle R.
Bow String Lake
L. Winnibigoshish
Cass L.
L. Itasca
Leech L.
Pokegama Falls
Mississippi R.
Lake Superior
Sandy L.
St. Louis R.
Bois Brule' River
Upper St. Croix Lake
46°23'
Otter Tail
Otter Tail R.
Leaf R.
Leaf L.
Crow Wing R.
French Rapids
Mille Lacs Lake
Little Falls
Pike Rapids
Mississippi River
Sauk Rapids
Bois de Sioux R.
Traverse
Big Stone
St. Croix River
Taylors Falls
St. Anthony Falls
Minnehaha Falls
Lake Pepin
Mississippi River
Minnesota River
Redwood Falls
Beaver Falls
Redwood River
Traverse des Sioux
96°
95°
94°
93°
92°
91°
49°
48°
47°
46°
45°
44°

Figure 28. Early water routes in Minnesota. (Head of steam navigation according to Appendix to House Journal, 1857-58).

north of the Ohio and east of the Mississippi could be peopled. Perhaps he was not so far wrong, reckoning as he necessarily did without steam or electricity. In any event, it is clear that while fur traders, explorers, and even lumbermen could travel in birch-bark canoes, a farming population, with women and children, domestic animals and agricultural implements, required more substantial means of transportation, both for themselves and their products. On this account the development of agriculture in Minnesota, as in other middle western states, depended in large measure on the provision of transportation facilities, not only within the State, but also farther east.

The Louisiana Purchase in 1803 opened the mouth of the Mississippi River to American shipping. The Erie Canal in 1825 linked the Great Lakes with the navigable Hudson. The next year steam navigation began on Lake Michigan; though the first steamship reached Chicago as late as 1832, and the first shipment of grain to the east from that port, consisting of seventy-eight bushels, occurred in 1838.[30] In 1833 the Ohio Canal connected Lake Erie with the Ohio River; in 1848 the Illinois and Michigan Canal provided a waterway from Lake Michigan to the Illinois River and the Mississippi; and in 1856 the Portage Canal, between the Fox and Wisconsin rivers, was completed, thus opening that ancient water route to vessels and cargoes too heavy to be portaged. Finally, the Sault Ste. Marie Canal in 1855 extended the head of navigation on the Great Lakes to Duluth, bringing all the shores of Lake Superior into direct connection with Buffalo. This canal, however, remained without material effect on agriculture in Minnesota until Lake Superior was connected by rail with the Mississippi and the Red River some fifteen years later.

Steam navigation on the Mississippi River

In the meantime steam navigation had begun on the Ohio River in 1811, and on the upper Mississippi in 1823, when the *Virginia* came up to Fort Snelling with a cargo of government stores. Until 1838, when the first cession of Indian lands occurred, there were no white settlements, aside from the fort and a few trading posts, the chief being at St. Peters (Mendota). This was consequently the destination of practically all vessels which came above Prairie du Chien. The usual cargoes were government stores and supplies for the fur traders, including whiskey. The passengers comprised mainly troops and fur traders, besides some tourists who usually drove across the prairie a few miles to see the Falls of St. Anthony while the vessel was unloading. Return cargo, except furs taken on at Mendota, was generally lacking.

So far as recorded, the landings at the fort were as follows:[31]

TABLE 1

YEARS	LANDINGS	YEARS	LANDINGS	YEARS	LANDING
1823	2	1829	?	1835	?
1824	?	1830	?	1836	5
1825	4	1831	?	1837	?
1826	10	1832	5	1838	9
1827	?	1833	?	1839	15
1828	?	1834	?		

The average for the eight years recorded suggests that up to 1838 probably five landings a year were about normal. What caused the large number in 1826 does not appear from the records; but the increase in 1838 and 1839 was evidently connected with the Indian cession and the beginning of immigration. Four landings are also recorded on the St. Croix in 1838 and one in St. Paul in 1839. Unfortunately no reliable figures are available for later years on the St. Croix, nor for any other year prior to 1844 in St. Paul. The first cabin in St. Paul was built in 1838, before the treaty of cession had been ratified; the first considerable immigration occurred in 1840, when all squatters were ejected from the Fort Snelling reservation; and the first store in St. Paul was opened in 1842, being followed by two more in 1843 and three others in 1844.[32] Between 1839 and 1844 commerce at St. Paul must have increased with extraordinary rapidity, for the steamboat arrivals in 1844 already numbered forty-one. The arrivals thereafter, as reported in the Sixth Report of the Minnesota Commissioner of Statistics for 1874, were as follows:[33]

TABLE 2

YEARS	LANDINGS	YEARS	LANDINGS	YEARS	LANDINGS
1844	41	1855	560	1865	829
1845	48	1856	857	1866	777
1846	24	1857	1,025	1867	883
1847	47	1858	1,068	1868	835
1848	63	1859	808	1869	792
1849	95	1860	775	1870	760
1850	104	1861	937	1871	553
1851	119	1862	1,015	1872	346
1852	171	1863	743	1873	No report
1853	200	1864	631	1874	218
1854	256				

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[30] *Report of Chicago Board of Trade*; *Bul.* 15, *Ill. Geol. Survey*, 71; Dopp, *Development of Wisconsin* (*Bul. Am. Geog. Soc.*, August, 1913).

[31] *Minn. Hist. Soc. Coll.* VIII, 376-377.

[32] Neill, Rev. E. D., in *Minn. Hist. Soc. Coll.* II, 139-140; Elfelt, C. E., *Early Trade and Traders in St. Paul* (*Minn. Hist. Soc. Coll.* IX, 163).

[33] *Minn. Ex. Doc.* 1874, No. 10, 98; based on report of the Deputy Collector of Customs at St. Paul. Lists differing somewhat and presumably less reliable are given in Merrick, *Old Times on the Upper Mississippi*, 295; and Blakeley, *Advent of Commerce in Minnesota* (*Minn. Hist. Soc. Coll.* VIII, 413).

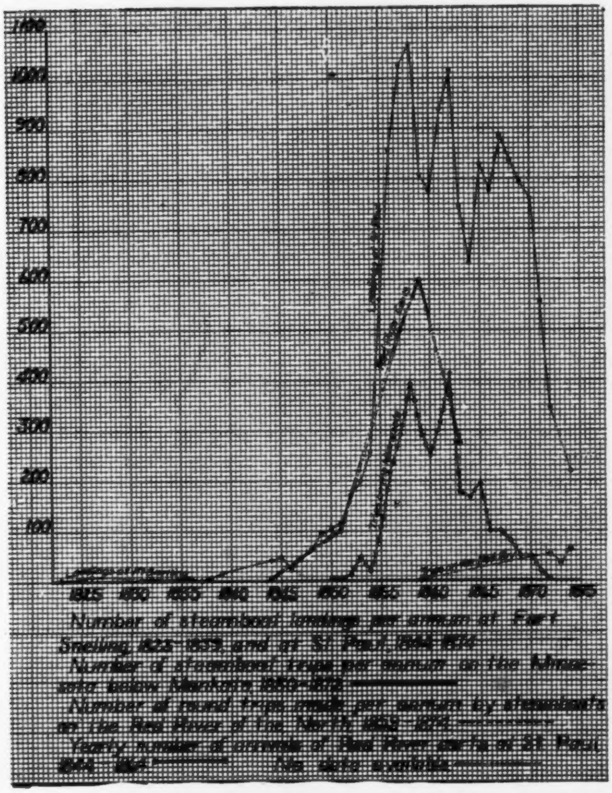

Figure 29. Rise and decline of steamboat and Red River cart traffic in Minnesota, as shown by the number arriving.

The striking character of these changes may be seen more clearly from a diagram based upon the preceding table.

It will be noted that the greatest number of boats arrived in 1858, though the number of different boats was only sixty-two as against ninety-nine in 1857, when the season of navigation happened to be shorter.[34] Evidently by 1858 a decline had already set in, due at first to the effect of the panic of 1857, later to the Civil War, and still later to railroad competition, railroad control of shipping terminals, and the refusal of railroads to pro-rate with water routes.

Steam navigation above the Falls of St. Anthony was inaugurated in 1850 with the *Governor Ramsey*, which was followed later by other boats; and it continued until the railroad began to parallel the river between 1863 and 1866. This stretch of navigable water extended as a rule only to Sauk Rapids above St. Cloud; though at high water boats were sometimes run through and operated on the upper river as far as Pokegama Falls near Grand Rapids. This happened in the case of the *North Star* in 1858. Owing to the relatively shallow water and short haul, steam navigation above St. Anthony was always limited compared to that below St. Paul.

Steam navigation on the Minnesota River

Steamboating on the Minnesota, aside from the lower stretch near Fort Snelling, began in 1850 with a series of excursions which for the first time made known the general character of that valley. The next year, by the treaty of Traverse des Sioux, the Indian title to most of the land in the Minnesota Valley was extinguished. This was soon followed by a tide of immigration, whose fluctuations are reflected to some extent in the following table,[35] though the stage of the water and the length of the season also had much influence.

TABLE 3

YEARS	STEAMBOAT TRIPS (BELOW MANKATO)	YEARS	STEAMBOAT TRIPS (BELOW MANKATO)	YEARS	STEAMBOAT TRIPS (BELOW MANKATO)
1850	4	1858	394	1866	100
1851	3	1859	300	1867	100
1852	13	1860	250	1868	80
1853	49	1861	318	1869	50
1854	30	1862	413	1870	50
1855	109	1863	177	1871	20
1856	207	1864	166	1872	1
1857	292	1865	195		

The maximum navigation on the Minnesota was evidently from 1857 to 1862 inclusive. There was also considerable freighting by keel boats and other crafts without steam power; and toward the end of the period there was more navigation (not covered by the table) above Mankato than below it, where railways were already available. The sudden and complete collapse of steam navigation on the Minnesota was due in part to the very cause which had produced it, namely, the increase of agriculture, which exposed large areas of loose soil to rapid erosion and thus filled up the river with shoals and sand bars; and in part to the advance of the railway up the valley from St. Paul, reaching Mankato in 1869 and New Ulm in 1871.

Steam navigation on the Red River

The first steamboat was launched on the Red River in 1859. Funds for its construction had been obtained in part by public subscription in St. Paul, the purpose being to secure the trade of the Fort Garry (Winnipeg) region. Other boats followed, and the Hudson Bay Company, represented by Norman W. Kittson, eventually secured control. The period of most active navigation in the Red River was during the years following 1871, when the Northern Pacific Railroad had reached Moorhead, the usual head of navigation, while the river north of that point was not yet paralleled by railroads.[36] During this period there were four or five boats on the river, which made from thirty-five to sixty-five round trips, depending largely on the stage of the water and length of the season.[37]

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[34] *Ibid.*, VIII, 402-405.

[35] Hughes, *Steamboating on the Minnesota River* (*Minn. Hist. Soc. Coll.* X, 1, 158-160).

[36] Blakeley, *Opening of the Red River to Commerce* (*Minn. Hist. Soc. Coll.* VIII; Bell, *Early Steamboating on the Minnesota and Red Rivers* (*Minn. Hist. Soc. Coll.* IX).

The Red River boats were an undoubted factor in promoting immigration and the development of agriculture in the Red River Valley, though owing to the earlier establishment of agriculture by the Selkirk settlers, more immigrants seem to have gone into Canada by this route than stopped off in the Minnesota part of the valley.[38]

Indian trails in Minnesota

When the whites first reached Minnesota, both the prairie and the forested district were traversed by a network of Indian trails, though relatively few trails, and those chiefly warpaths, connected the territories occupied by Sioux and Ojibways. The trail paralleling the Mississippi was evidently based on a buffalo trace, since this was the route of the annual buffalo migration. The same thing was true in the Red River Valley; and it is probable, though it can not now be proved in detail, owing to the early obliteration of the trails, that the same relation existed in other cases. The Indian trails in turn gave general direction to most of the early roads; for example, the trail from Mendota via Northfield, Faribault, and Waseca to Spirit Lake, Iowa, was adopted for one of the military roads authorized in 1850.[39]

The sledge and and the Red River cart

Considerable use was doubtless made of the Indian trails by the early fur traders, packing goods on their backs. In general, however, the first forms of land transportation used by whites in Minnesota were the sledge in winter and the Red River cart in summer. For persons and light goods, extended use was made of dog sledges, the usual rate of travel being from thirty to forty miles a day.[40] For heavy haulage, horse and ox sleds were employed, the route often following the course of a river.[41] The freeze-up, indeed, which transforms marsh and river into solid and level roads, greatly facilitated logging operations and thus hastened the cutting away of the forests in all the states bordering the Great Lakes; and it has been almost equally important in relation to agriculture. Without the solid roads formed by frost for three or four months each year it would not have been possible to operate farms at any considerable distance from the railroad; unless, indeed, something better than earth roads were provided.

The Red River cart was a rough, two-wheeled affair, made entirely of wood and drawn by oxen. In appearance it was practically a duplicate, and it was no doubt in fact a lineal descendant, of the type of cart represented on Trajan's column at Rome. The French voyageurs, on reaching the prairies, simply reverted to the primitive type of cart which was at that time more or less used in France, as it still is in Spain, Russia, and the Balkan region. The first Red River cart is said to have been made in 1801.[42] Red River carts were brought into Minnesota by refugees from the Selkirk colony, perhaps as early as 1821; certainly they were a familiar object by 1839, when it is recorded that forty or fifty cartloads of emigrants from the Selkirk settlement were camped at Fort Snelling.[43] Originally the carts simply followed the sandy ridges, marking ancient beaches of Lake Agassiz, through the Red River Valley, usually on the Dakota side, and then crossing between lakes Traverse and Big Stone, headed for Traverse des Sioux[44] (Fig. 28). In 1844, however, after Norman W. Kittson had established his trading post at Pembina, Hallett cut out a trail running farther north, from the mouth of the Crow Wing River to the northern end of Otter Tail Lake, and then into the open valley, paralleling largely the old canoe route between the Mississippi and the Red River (Fig. 28). The distance by this route from Pembina to St. Paul was said to be 448 miles and the time by cart thirty to forty days.[45] The stage route laid out in 1859, following an intermediate course along the edge of the hardwood belt (Fig. 8), went by way of Sauk Rapids, Osakis, Alexandria, Pomme de Terre (near Ashby), and Breckenridge.[46] It will be noted that the Northern Pacific Railroad, between Brainerd and Perham, takes the general direction of the Hallett trail; and that, as far as Pomme de Terre, the Great Northern follows very closely the stage route of 1859.

In 1844 regular trains of Red River carts began to reach St. Paul, bringing chiefly buffalo tongues, buffalo robes, pemmican, and furs, and taking back general supplies.[47] This trade grew rapidly, especially after the Hudson Bay Company in 1858 and 1859 made the Mississippi rather than Hudson Bay its chief route to market and base of supplies. It was estimated that during 1869, 2,500 Red River carts passed up and down the valley.[48]

The reported arrivals of Red River carts at St. Paul were as follows:[49]

TABLE 4

YEARS	NUMBER OF CARTS	YEARS	NUMBER OF CARTS	YEARS	NUMBER OF CARTS
1844	6	1851	102	1858	600
1845	?	1852	?	1859	?
1846	?	1853	?	1860	?
1847	?	1854	?	1861	?
1848	?	1855	?	1862	?
1849	?	1856	?	1863	275
1850	?	1857	500	1864	?

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[37] *Minn. Statistics*, VI Report (*Minn. Ex. Doc.* 1874, I, No. 10, 102).
[38] *Minn. Statistics*, IV Report (*Minn. Ex. Doc.* 1872, 729).
[39] Law of July 18, 1850 (32 Cong., 1 sess. Doc., 12, 7; *Sen. Doc.*, 33 Cong., 2 sess. II, 346.)
[40] *Minn. Hist. Soc. Coll.* IX, 21; *Minnesota Pioneer*, Jan. 3 and 29, 1852.
[41] Seymour, *Sketches of Minnesota* (1849), 148-150.
[42] Bell, C. N., *The Selkirk Settlement*, 30.
[43] *Minn. Hist. Soc. Coll.* II, 138.
[44] *Minnesota in Three Centuries*, 311.
[45] Schultz, John, *The Old Crow Wing Trail* (*Minn. Hist. Soc. Coll.* IX, 20). *Journal Minn. House of Rep.*, 1859-60, 2 sess., appendix D, 27, 36.
[46] *Minn. Hist. Soc. Coll.* VIII, 45; *Journal, Minn. House of Rep.* 2 sess., 1859-60, appendix D.
[47] *Minn. Hist. Soc. Coll.* IX, 20.
[48] Coffin, *The Seat of Empire* (1870), 80-81.
[49] Williams, *History of St. Paul*, 306.

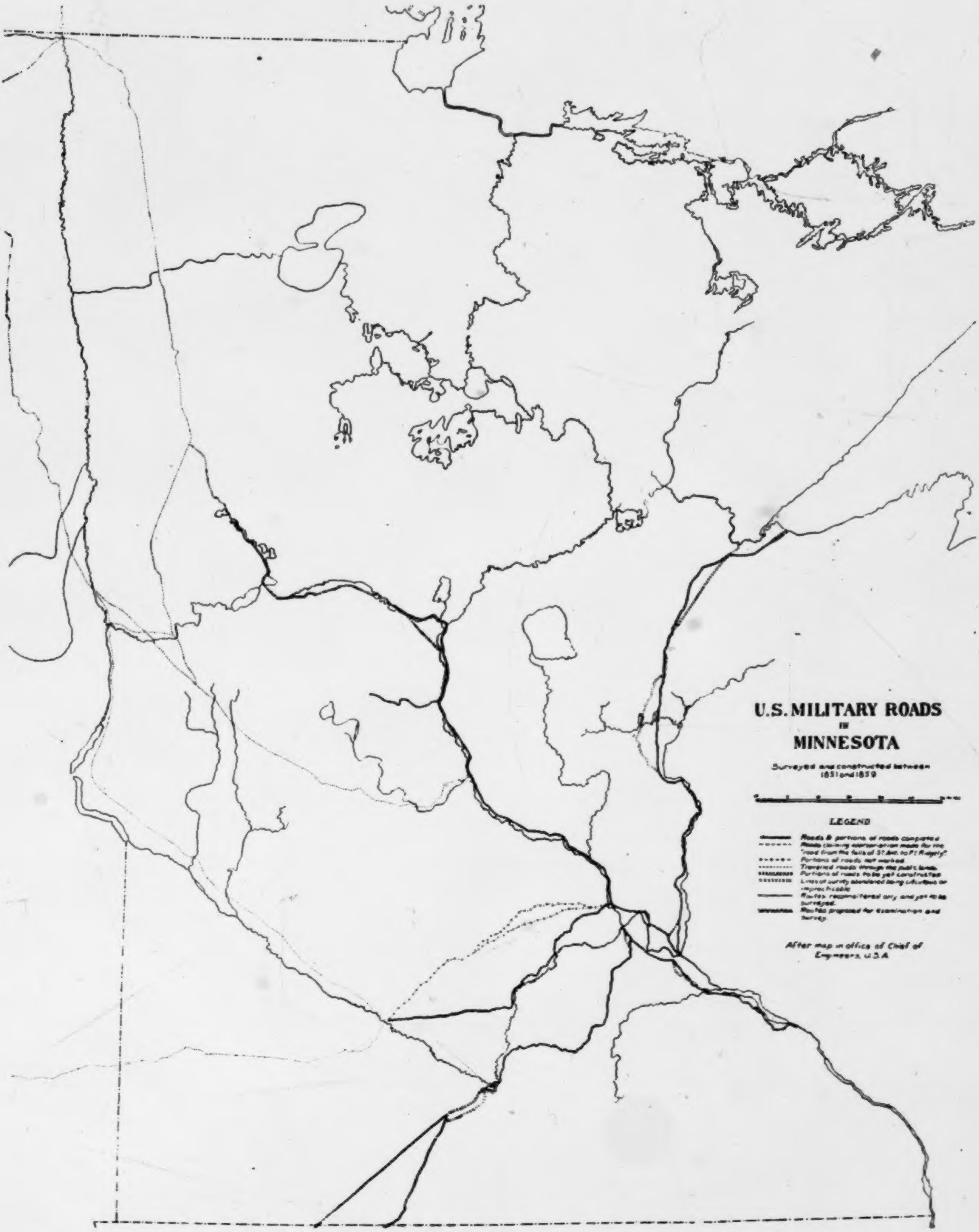
U.S. MILITARY ROADS
IN
MINNESOTA
Surveyed and constructed between
1851 and 1859
LEGEND
Roads & portions of roads completed
Roads claiming appropriation made for the "road from the falls of St Ant. to Ft Ripley"
Portions of roads not worked
Traveled roads through the public lands
Portions of roads to be yet constructed
Lines of survey abandoned being difficult or impracticable
Routes reconnoitered only and yet to be surveyed.
Routes proposed for examination and survey.
After map in office of Chief of Engineers, U.S.A.

Figure 30. U. S. military roads in Minnesota, 1851-1859. (From map in office of Chief of Engineers, U. S. A.)

After 1867, when the St. Paul and Pacific Railway (Great Northern) had reached St. Cloud, the Red River cart began to stop wherever the railway terminus happened to be; and after the Northern Pacific was completed to Moorhead in 1871, the picturesque Red River carts disappeared from Minnesota. For at least half a century they had played a considerable rôle in transportation; though on the whole serving rather the interests of buffalo hunting and the fur trade than of agriculture, because only goods of considerable value in proportion to their bulk could stand the cost of transportation by cart for such great distances.

Early wagon roads in Minnesota

Settlement in Minnesota, aside from the outlying Pembina region, began in the district between Fort Snelling and the St. Croix, of which St. Paul is the geographical center. The first wagon roads were consequently laid out from St. Paul to Fort Snelling, Mendota, Stillwater, and Willow River (Hudson), Wisconsin.

Another road ran across the prairie to St. Anthony, and then up the east bank of the Mississippi to Sauk Rapids and Crow Wing. Crossing the river at these points, two trails (rather than roads) continued northwest to the Red River Valley. Such was the situation as to roads in 1849, when regular stage lines for passengers and (in 1851) express traffic were established between the principal settlements.[50] In January, 1850 a road for use during the winter was opened along the east bank of the Mississippi from St. Paul through Prairie du Chien to Galena.[51] This was the first means of transportation between Minnesota and the

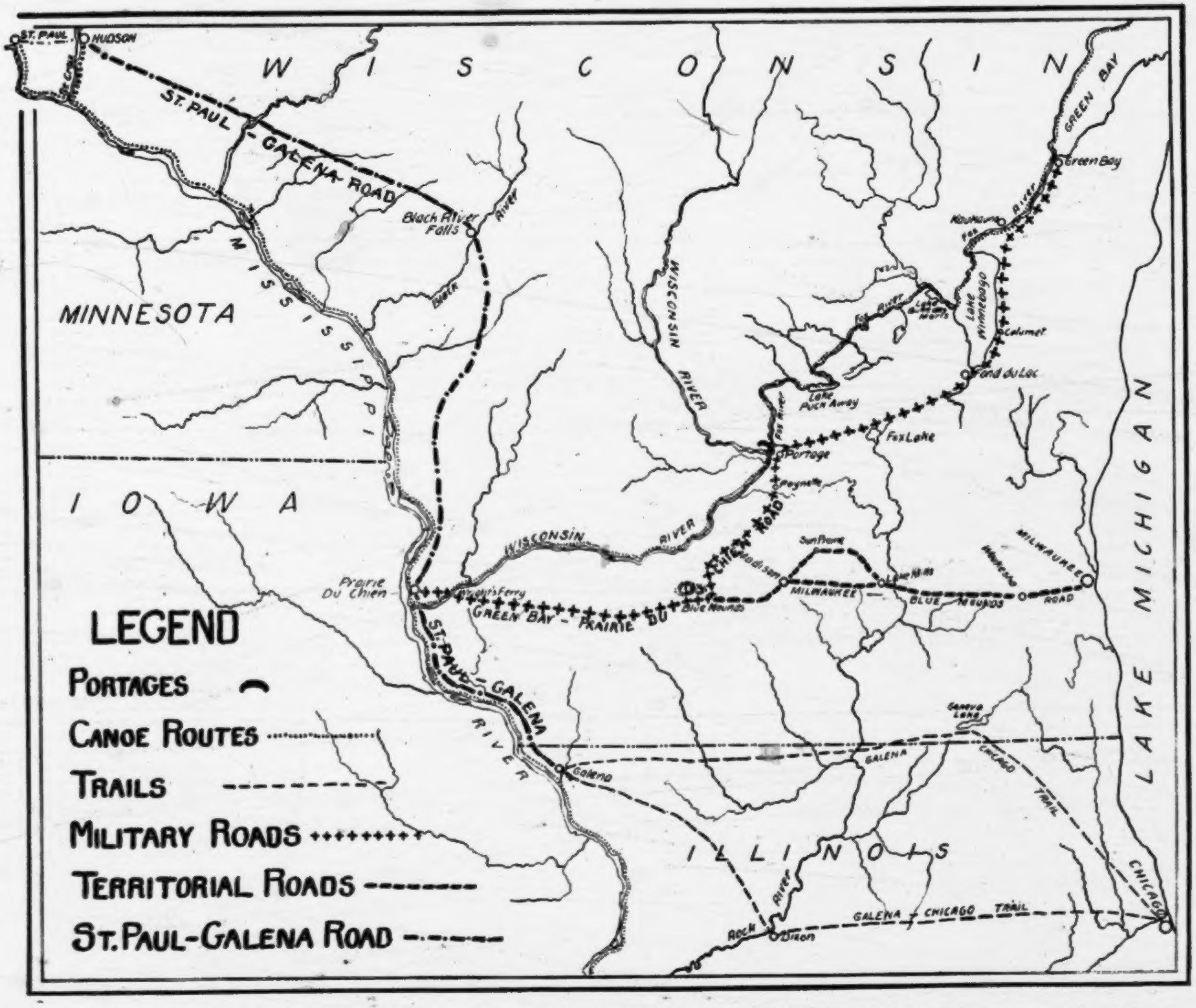
WISCONSIN
MINNESOTA
IOWA
ILLINOIS
LAKE MICHIGAN
GREEN BAY
St. Paul
Hudson
ST. PAUL - GALENA ROAD
Black River Falls
Black River
MISSISSIPPI
WISCONSIN RIVER
Green Bay
Kaukauna
Fox River
Lake Winnebago
Lake Butte des Morts
Calumet
Fond du Lac
Lake Puckaway
Fox Lake
Portage
Poynette
Sun Prairie
Madison
Lake Mills
MILWAUKEE
Milwaukee
Blue Mounds
MILWAUKEE - BLUE MOUNDS ROAD
WISCONSIN RIVER
Prairie Du Chien
Ferry
GREEN BAY - PRAIRIE DU CHIEN ROAD
ST. PAUL - GALENA
RIVER
Galena
Geneva Lake
GALENA
CHICAGO TRAIL
Rock River
Dixon
GALENA - CHICAGO TRAIL
CHICAGO
LEGEND
PORTAGES
CANOE ROUTES
TRAILS
MILITARY ROADS
TERRITORIAL ROADS
ST. PAUL-GALENA ROAD

Figure 31. Early overland routes from the Mississippi to Lake Michigan. (After Thwaites, letter cited; Merrick, 206; Seymour, 215; 26 Congress 1 Session, *Senate Document* 140; *Wisconsin Historical Collections,* 6:369, 7:372; Minnesota House of Representatives, *Journal,* App. 51, 1857-58; *Minnesota in Three Centuries,* 2:198, 4:309) The route of the St. Paul-Galena road is definitely stated to have been by way of Black River Falls, but in other respects its course is somewhat uncertain.

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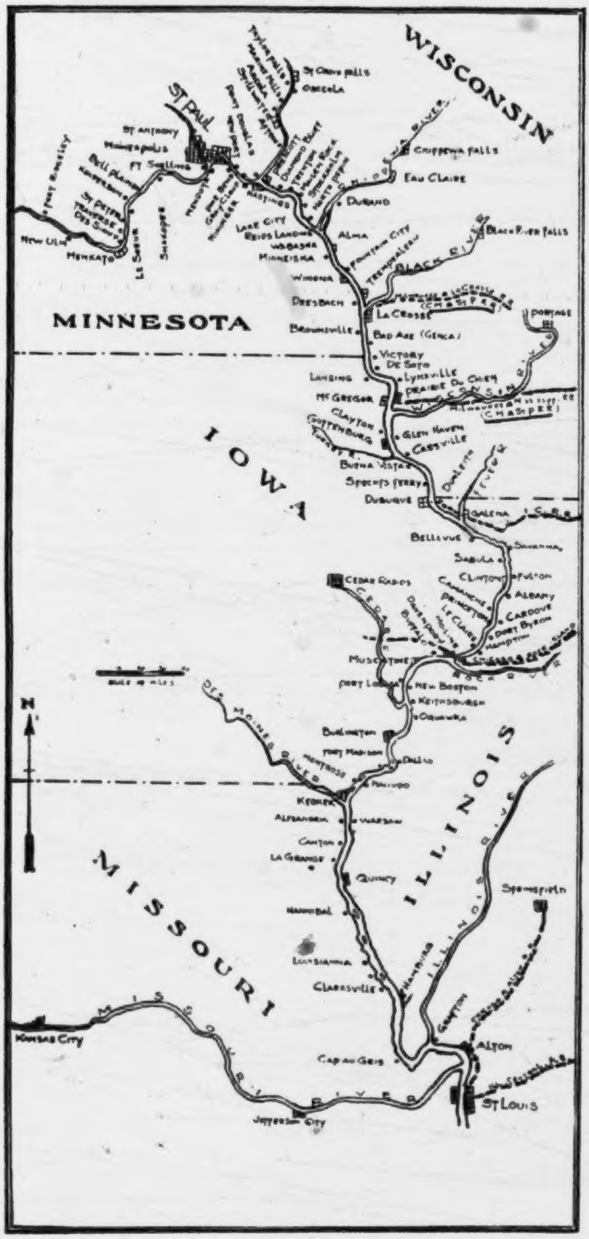
[50] Baker, J. H., *History of Transportation in Minnesota* (*Minn. Hist. Soc. Coll.* IX, 1-34).
[51] *Minnesota Pioneer,* Jan. 2, 1850.

outside world during the season of closed navigation. In July, 1850 Congress authorized a military road from Mendota along the west bank of the Mississippi; and in 1853 a winter stage line was established over this route to Dubuque.[52] In the same act another road was approved to extend south from Mendota through Northfield and Faribault into Iowa. A military road was also opened in 1856 from St. Paul to Fond du Lac and Superior.[53] During the years 1853-1857 the second military road authorized in the law of 1850 was also pushed southward from Mendota toward the mouth of the Big Sioux River (Sioux City).[54] On all of these roads stage lines were operated until the coming of the railroads, which in practically every case closely paralleled these highways.


WISCONSIN
MINNESOTA
IOWA
ILLINOIS
MISSOURI
St Paul
St Anthony
Minneapolis
Ft Snelling
St Croix falls
Osceola
Chippewa falls
Eau Claire
Durand
Black River falls
Black River
Alma
Fountain City
Trempealeau
Lake City
Reids Landing
Wabasha
Minneiska
Winona
Dresbach
La Crosse
Brownsville
Bad Axe (Genoa)
Victory
De Soto
Lansing
Lynxville
Prairie du Chien
Portage
McGregor
Clayton
Guttenburg
Glen Haven
Cassville
Buena Vista
Specht's Ferry
Dubuque
Galena
Bellevue
Savanna
Sabula
Clinton
Fulton
Albany
Cordova
Port Byron
Hampton
Le Claire
Princeton
Camanche
Davenport
Buffalo
Moline
Cedar Rapids
Muscatine
Rock River
Port Louisa
New Boston
Keithsburgh
Oquawka
Burlington
Fort Madison
Dallas
Montrose
Nauvoo
Keokuk
Des Moines River
Alexandria
Warsaw
Canton
La Grange
Quincy
Hannibal
Louisiana
Clarksville
Hamburg
Illinois River
Grafton
Alton
Springfield
Cap au Gris
St Louis
Kansas City
Jefferson City
Missouri River
Mankato
New Ulm
Fort Ridgley
Le Sueur
Shakopee
Hastings
Scale in miles
N

Map of the Mississippi between St. Louis and St. Paul

Figure 32. Sketch map of the Mississippi showing railroads and river ports in 1860. (After Merrick)

Outlets by land from the Mississippi Valley

The National Road, completed in 1818 across the mountains to the upper Ohio, was second only to the Erie Canal (1825) in its influence on the peopling of the West. To it was due in no small measure the rapid development of the Ohio Valley, and of St. Louis which long remained the chief base of supplies for the upper Mississippi country. Owing to the opening of the Wisconsin-Illinois lead district, which began in 1822, Galena, the metropolis of this district, became the usual transhipment point for both passengers and freight. As a result, well-marked, if not always well-made, roads ran from Galena to Milwaukee and Chicago even before the Black Hawk War in 1832, the trip requiring about eight days.[55] In 1833 a trail was blazed from Green Bay to Prairie du Chien, paralleling the old French canoe route; and in 1835 a United States military road was built over this trail.[56] In 1834, Michigan territory had authorized (but not built) a road from Milwaukee via Platte Mounds to the Mississippi. In accordance with this plan a territorial road was laid out in 1837 from Milwaukee to Madison, joining the military road near Blue Mounds in the western part of Dane County.[57] Provision was also made in 1838 for a military road from Milwaukee to the Mississippi opposite Dubuque, but the appropriation was apparently spent on the territorial road east of Madison.[58] For some twenty years thereafter, until 1854, practically all the exports of the upper Mississippi, except such as took the water route to New Orleans, were divided between these routes to Lake Michigan. The typical freight wagon used on these roads was a ponderous "prairie schooner" drawn by six to a dozen yoke of oxen.[59] Such outfits were used in bringing the lead of the southwestern district to Milwaukee for shipment east. There were also stages of various types for passenger traffic, some merely open wagons.[60] The time by stage was from eight to ten days, depending on the condition of the roads; and by 1849 there were daily stages from Milwaukee and Chicago to Galena.[61] Transportation was indeed cheaper to St. Louis, but the best market for the product of the upper valley and likewise the source from which settlers were drawn, was the North Atlantic section. As a result Galena vied with St. Louis as a supply and outfitting station for the upper valley; and it easily took the first place as a source of loanable capital, until the establishment of direct railroad connection between Chicago and St. Paul.

Outlets by rail from the Mississippi Valley

The first railway from tide-water reached the Great Lakes at Buffalo in 1842, Chicago in 1852, and the Mississippi at Rock Island early in 1854. This was followed by a grand excursion up the river to St. Paul, a public reception and speech-making, in which former President Fillmore and George Bancroft, the historian, took part.[62] This celebration proved effective in turning public attention to Minnesota and was one factor in starting a great stream of immigration to the territory.

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[52] Baker, *loc. cit.*, 19.
[53] Soil Survey of Carlton County (Bureau of Soils, U. S. Dept. of Agr.).
[54] Baker, *loc. cit.*, 19, 32 Cong., 1 sess., Doc. 12, 7.
[55] Seymour, *Sketches of Minnesota* (1849), 275; Bond, *Minnesota and Its Resources*, 178; Ill. Geol. Survey, *Bul. 15*, 89; *Bul. Am. Geog. Soc.* (Aug., 1913), 593.
[56] Map in *Sen. Doc. 140*, 26 Cong., 1 sess. (1839); Lapham, Increase, *Wisconsin* (1844); Matteson, C. G., *History of Wisconsin*, 171-172.
[57] *Wis. Hist. Coll.* VI, 369, 372.
[58] Letter from Reuben G. Thwaites, under date of Sept. 20, 1913, modifying the account of roads given in his *Wisconsin*, 250-251.
[59] Thwaites, *Wisconsin* (Am. Commonwealth Series).
[60] Bond, *loc. cit.*, 173-178.
[61] Seymour, *loc. cit.*, 275.

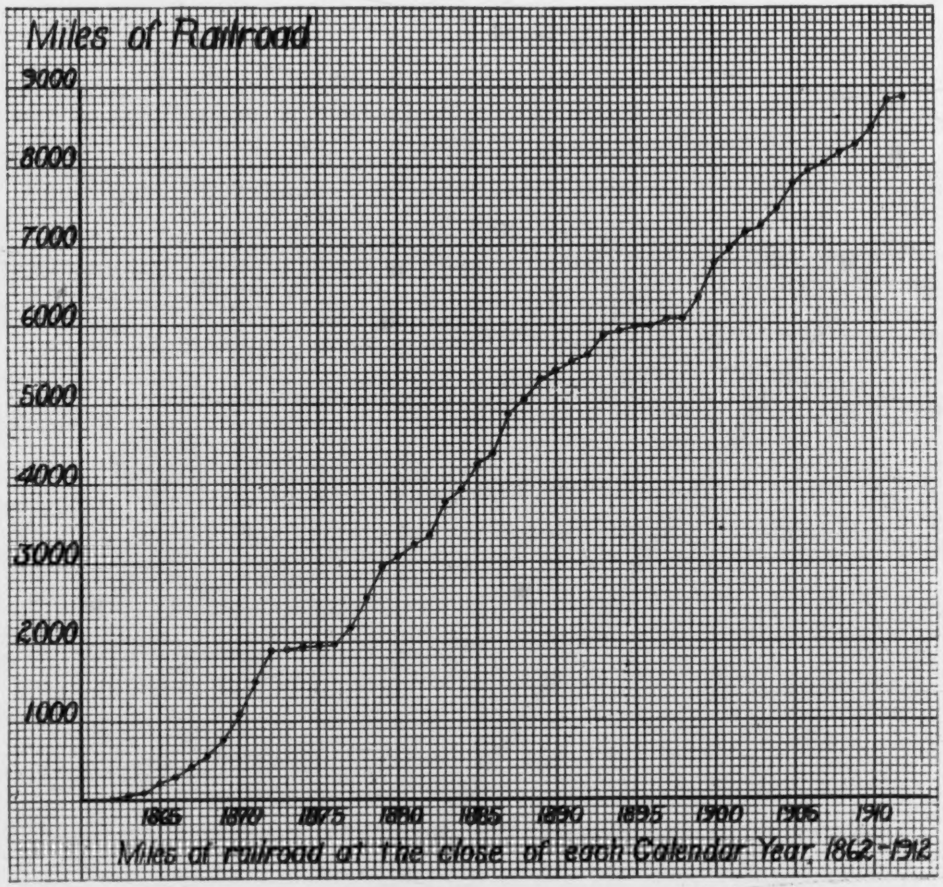

Figure 33. Progress of railroad construction in Minnesota, 1862-1912. (Data from Report of Railroad and Warehouse Commission, 1912)

In 1855 the Galena and Western Union (Illinois Central) Railroad, passing through Galena which lies some miles up a tributary, reached the Mississippi at Dunleith (East Dubuque).[63] This road enabled Galena to hold its position in the river trade, which had been threatened by the Rock Island road, and it further increased the flood of immigration to Minnesota. On April 15, 1857 the Milwaukee and Mississippi Railroad was completed to the river at Prairie du Chien; and immediately this ancient seat of the fur trade took on new life and became the principal transfer point for Minnesota exports. A third stream of immigration also began to reach the river at this point.[64] These were the bonanza days of steamboating on the river, when a vessel launched in the spring not infrequently cleared two hundred per cent on its cost during the first season.[65] Finally, on October 14, 1858 the Milwaukee and La Crosse Railroad reached the river, and thereafter La Crosse began to divide the export of Minnesota products with Prairie du Chien.[66] By that time, however, the after-effect of the panic of 1857, which was especially severe in Minnesota, had caused a great shrinkage in the volume of immigration, so that relatively few settlers came by way of La Crosse until the railways had been so extended that it became possible (1867) to reach St. Paul by rail through Prairie du Chien and Owatonna.

Early railroads in Minnesota

In Minnesota the earlier public discussions were all about roads, but about 1852 interest shifted to railroads. By lavish land grants and bonuses, including state bonds, the attempt was made to stimulate railroad building ahead of the demands of population. In the main, this attempt brought only disappointment, debt, and disgrace.[67] The first pieces of railroads actually

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[62] Folwell, *loc. cit.*, 121.
[63] *Minn. Hist. Soc. Coll.* VIII, 402.
[64] *Milwaukee Sentinel*, April 16, 1857; *Minn. Hist. Soc. Coll.* VIII, 402-405.
[65] Merrick, George B., *Old Times on the Upper Mississippi* (Cleveland 1909).
[66] Paxson, *The Railroads of the Old Northwest* (*Trans. Wis. Acad. of Sciences*, XVII).
[67] Message of Governor Ramsey, Jan. 9, 1861 (*Minn. Ex. Doc.* 1860, 11-12).

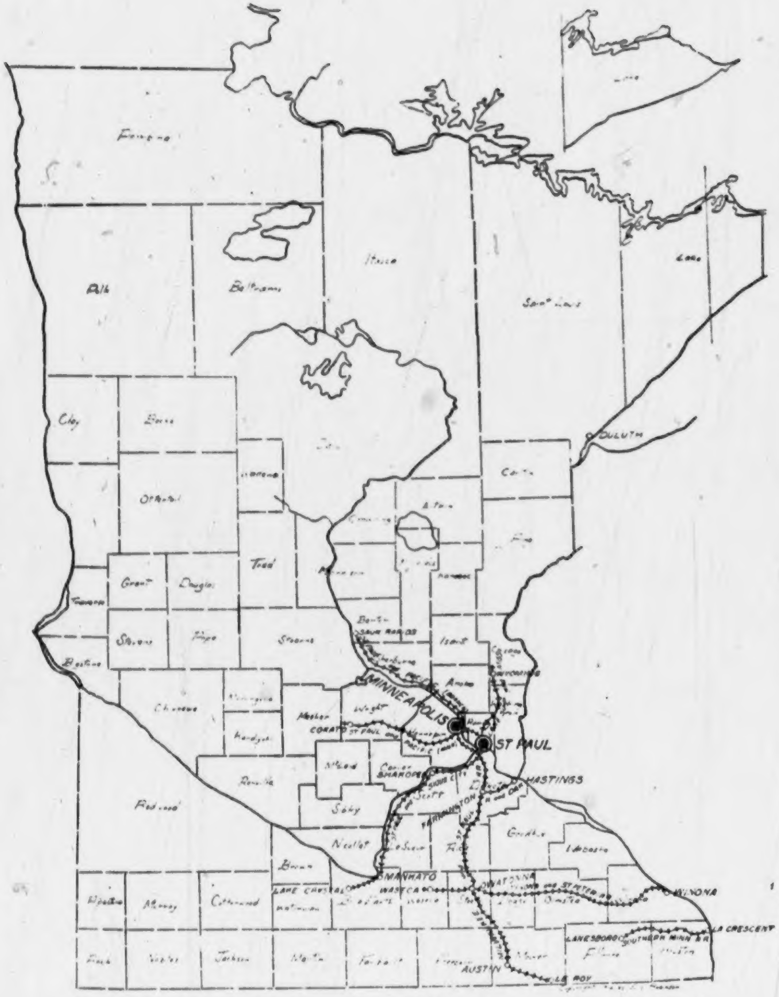
DULUTH
MINNEAPOLIS
ST PAUL
HASTINGS
MANKATO
WINONA
LA CRESCENT
AUSTIN

Figure 34. Railroads in operation, January 1, 1869. (Data from Report of the Railroad Commissioner, 1871, p. 40; 1873, map; 1879, p. 15; *Minn. Statistics*, 1869, p. 116-121; 1870, p. 162-168)

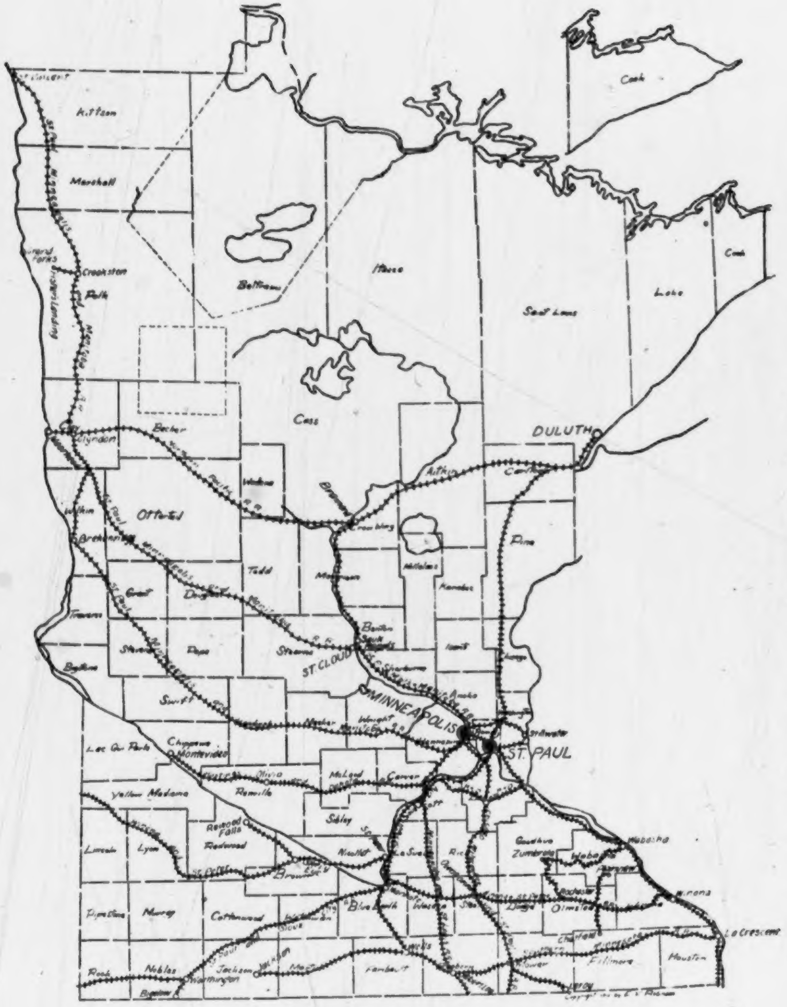
DULUTH
ST. CLOUD
MINNEAPOLIS
ST. PAUL
Crookston
La Crescent

Figure 35. Railroads in operation, June 30, 1879. (Data from Report of Railroad Commissioner, 1873, map; 1879, p. 9)

completed in Minnesota were from St. Paul to St. Anthony, and from Winona westward about ten miles, both in 1862.[68] During the next few years the St. Paul and Pacific (Great Northern) was pushed on up the east bank of the Mississippi, following the road toward Sauk Rapids; the Winona road was continued westward; a parallel line was begun through the southern tier of counties, starting just opposite La Crosse and following the Root River Valley; the Minnesota Valley (Omaha) line was undertaken up the Minnesota Valley; another road (main line of St. Paul and Pacific) was begun toward the west from Minneapolis; a sixth line (Minnesota Central) was pushed southward from Mendota; the St. Paul and Duluth (Northern Pacific) was begun from St. Paul northward toward the head of Lake Superior; finally from the Mississippi, opposite the mouth of the St. Croix, another railroad (Hastings and Dakota) was begun toward the west, not touching either St. Paul or Minneapolis. The line from Mendota through Northfield followed in a general way the old Indian warpath, largely along the divide between the Minnesota and the Mississippi,[69] which Congress in 1850 had designated as the route of a military road. In 1866 this line crossed the Winona road at Owatonna. During the next summer the Milwaukee and St. Paul Company, having acquired and completed the Minnesota Central to McGregor, Iowa, installed a pontoon bridge to connect with the Milwaukee and Mississippi road at Prairie du Chien, establishing thus in November, 1867 the first through railroad route from St. Paul to the Great Lakes and the East.[70] These eight roads or portions of roads were the only ones constructed prior to the crop season of 1869, which is reported in the census of 1870 (Fig. 34).

During the prosperous years preceding the panic of 1873, railroad building in Minnesota as elsewhere progressed with giant strides. In 1870 railroad connection was established between St. Paul and the head of Lake Superior, following in a general way the military road opened in 1856. In 1871 the St. Paul and Pacific (main line) arrived at Breckenridge[71] and the Northern Pacific, building west from Duluth, reached Moorhead, the head of navigation on the Red River. The same year saw the establishment of direct rail connection between St. Paul and Chicago by way of Tomah, Wisconsin. In 1872 the Minnesota Valley Railroad reached the Missouri River at Sioux City, while the Winona (Northwestern) line penetrated to the western boundary of the State.[72] In the meantime the St. Paul and Pacific, besides uniting the upper Red River Valley directly with Minneapolis, had constructed important pieces of track which were later (1878) to become the nucleus of the Great Northern system.

Thus, in the space of ten years altogether, and for the most part within five years, the dependence of the State on Red River carts, stage lines, and river navigation for intercourse with the outside world came to an end, and the way was opened for the rapid settlement and agricultural development of Minnesota.

[68] Message of Governor Ramsey, Jan. 7, 1863 (*Minn. Ex. Doc.* 1862, 22-23).

[69] *Journal Minn. House of Rep.* 1857-58, appendix, 51.

[70] McClung, J. W., *Minnesota as It Isi n 1870*, 133. Letter under date of Nov. 3, 1913, from W. H. Norris, attorney of Chicago, Milwaukee & St. Paul Railway at Minneapolis.

[71] Williams, *loc. cit.*, 405; *Report of Railroad Commissioner*, 1872, 7-17.

[72] Message of Governor Marshall, Jan. 2, 1870 (*Minn. Ex. Doc.* 1869, 14); Message of Governor Austin, Jan. 5, 1871 (*Minn. Ex. Doc.* 1870, 23); Second Annual Report of Commissioner of Statistics (*Minn. Ex. Doc.* 1870, 1050-1052); Message of Governor Austin, Jan. 4, 1872 (*Minn. Ex. Doc.* 1871, 1, 16); Second Annual Report of Railroad Commissioner (*Minn. Ex. Doc.* 1872, 1, 133, 169, 341).

CHAPTER III

SETTLEMENT AND DEVELOPMENT OF PIONEER AGRICULTURE, 1838-1860

Indian cessions in Minnesota

The Indians continued to hold title to all land in Minnesota, aside from the military reservation, until 1838. In that year Congress ratified a treaty, negotiated in 1837, by which the United States acquired title to the district between the St. Croix and the Mississippi, as far north as the mouth of the Crow Wing River.

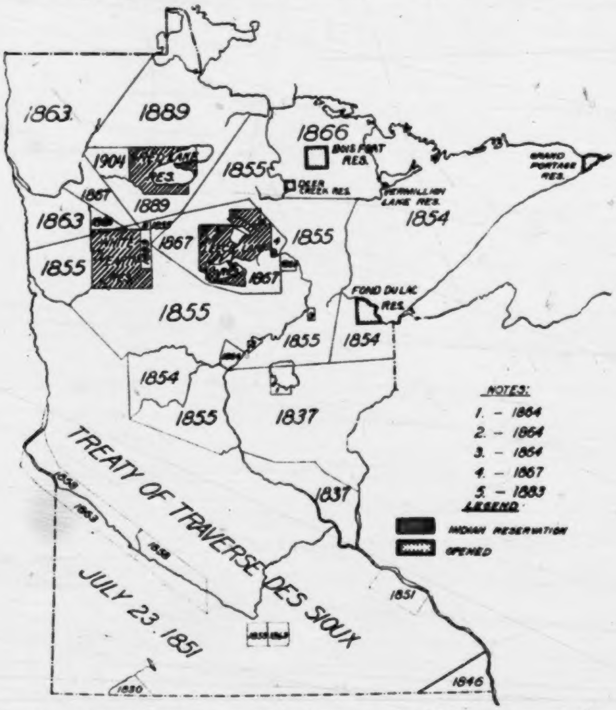

Figure 36. Extent and dates of Indian cessions with present reservations in Minnesota. (After Report of Bureau of Ethnology, 1899, and 1913 map by Office of Indian Affairs.)

This cession was relatively small and confined in the main to the forested region, the southern portion of it bearing hardwood, while the northern extended into the pineries. Moreover, the survey was delayed so that not until August 14, 1848, could title be obtained to any land in Minnesota. On that date, at the land office at St. Croix Falls, 3,326 acres were sold at $1.25 an acre, including the town sites of St. Paul, Stillwater, and St. Anthony.[1]

It will be noted that the cession of 1838 did not extend west of the Mississippi. All of southeastern and southern Minnesota, including the prairie section, remained Indian country, jealously guarded by the Sioux, until the treaties of Traverse des Sioux and Mendota in 1851. As a result, the advance of settlement was necessarily discontinuous, passing by the southeastern district and spreading from the so-called "delta" between the St. Croix and Mississippi rivers.

Beginnings of the lumber industry in Minnesota

Prior to the great migration of 1854-1857 furs and lumber furnished the economic motives which brought people to Minnesota. It was the desire of lumbermen to get at the Minnesota pineries which led to the cession of 1838; and the principal effect of this cession was the development of lumbering in Minnesota.

The first lumber mill in Minnesota was erected by the soldiers at the Falls of St. Anthony in 1821 to saw lumber for Fort Snelling, using logs cut on Rum River. Two years later a gristmill was also built to grind wheat grown on the military reservation.[2] These mills, however, were only operated spasmodically and ceased operation as government mills before either lumbering or agriculture had been established in Minnesota on a commercial basis.

In Minnesota, as previously in Wisconsin and Michigan, the magnificent forests of white and Norway pine attracted lumbermen from northern New England, and especially from Maine, who brought with them the experience and methods developed under substantially similar climatic conditions. The lumber industry, therefore, advanced with great rapidity after 1838 so that by 1850 it rivaled the fur trade as the dominant interest of the territory.

From 1822 on, repeated attempts had been made by private parties to cut logs, especially on the St. Croix; but these attempts had been frustrated, largely by the vigilance and firmness of Major Taliaferro, the Indian agent at Fort Snelling.[3] As soon as the treaty of 1837 was negotiated and before it had been ratified, logging for private account began on the St. Croix. This was during the autumn. Eleven years later, in 1848, logging also commenced on the Rum River, which heads in Mille Lacs and enters the Mississippi not far above the Falls of St. Anthony.[4] During these intervening years it will be remembered that individuals could secure no title to land in Minnesota. Under the Preëmption Act a man could, indeed, occupy land and claim the right to purchase it at a fixed price, when surveyed. This was the method employed for water-power sites and town lots. In general, however, the lack of title did not greatly hamper the development of lumbering, since it was the prevalent idea that whatever belonged to the government belonged to the people, not merely in a collective sense, but also individually; or as one of the early St. Croix lumbermen expressed it, "as citizens inheriting an interest in the government."[5] From this it was inferred that every citizen had a perfect right to cut timber on government land, and that any attempt on the part of the government to prevent it, or to collect payment for such cutting, was a tyrannical procedure. This peculiar logic, confusing collective and individual rights, doubtless has much to do with the almost insuperable difficulty still encountered by the government in protecting, not only forests, but grass lands, minerals, and all other natural resources from depredations by men who, in other respects, are often good citizens.

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[1] Williams, J. F., *History of St. Paul*, 183-185; *Minn. Hist. Soc. Coll.* II, 133, 134.
[2] *Ibid.*, X, pt. 2, 635.
[3] *Ibid.*, II, 107, 118, 131, 132.
[4] Stanchfield, Daniel, *Pioneer Lumbering on the Upper Mississippi* (*Ibid.*, IX, 329).
[5] *Ibid.*, IX, 296.

The first logs cut on the St. Croix were used in building mills at St. Croix Falls (1838) and Marine Mills (1839). Other mills were also erected at Stillwater (1843), Osceola, Wisconsin (1845), for which logs were largely cut on the Minnesota side, Lakeland (1848), and Arcola (1848). The first lumber placed on the market came from the Marine mill during the summer of 1839. Many (perhaps a third) of the logs cut on the St. Croix and some from the upper Mississippi, were rafted down the river to mills at Rock Island, Moline, and other towns as far south as St. Louis. In the early days much of the sawed lumber was also made up into rafts and taken to market by river.[6] The first private mill in Minnesota on the Mississippi began work in 1848 at St. Anthony (now East Minneapolis), which had been laid out the preceding year.[7]

Around these various mills villages quickly grew up, which were the first distinctively American settlements in Minnesota. The lumber industry thus built up many towns on the Mississippi and its tributaries, both in Minnesota and farther south. Moreover, the abundance and consequent cheapness of lumber played an important part in the rapid development of agriculture, as soon as transportation facilities became available, especially in the prairie district toward the south and west.

The settlement of Minnesota

At the census of 1840 the only part of Minnesota open to white settlement was the district between the St. Croix and the Mississippi, which formed a part of St. Croix County, Wisconsin. This county also included all of Wisconsin west of a line from the mouth of Porcupine River, which enters Lake Pepin, to Lake Superior.

The population of the county, aside from Indians, was 809, according to the census of 1840 (Appendix, Table I). How many of these lived in Minnesota it is, of course, impossible to say; but they comprised, aside from trappers and fur traders, chiefly lumbermen arrived on the St. Croix since the cession of 1837-1838. This number presumably did not include the little group (25 in 1837) around the trading post at Mendota, the oldest settlement in Minnesota; or the squatters on the Fort Snelling reservation; or the scattered traders along the Cannon, Minnesota, and other rivers, since all of these lived west of the Mississippi.

According to the census of 1840 (Appendix, Table I), there were three sawmills, employing 77 men, and seven general stores, in St. Croix County. There were also 90 men reported in connection with "forest products," meaning apparently trappers and fur traders. The value of skins and furs was given as $43,000. The fisheries, evidently on Lake Superior, occupied 127 men, the product being 4,282 barrels of pickled fish and 1,500 gallons of fish oil. There were only 815 head of live stock of all kinds, including swine and poultry. More than half (434) were cattle, probably work oxen about the lumber camps; though the value of dairy products was given as $220. The yield of crops was 9,031 bushels, nearly all being potatoes (8,014 bushels) and corn (606 bushels).

From these figures it is evident that agriculture, as an independent occupation, did not exist in Minnesota in 1840, at least in the region east of the Mississippi which was covered by the census.

Beginnings of agriculture in Minnesota

Stock-raising and farming were carried on to a limited extent about some of the important trading posts. Thus, Governor Cass in 1820 found an enclosed garden of about four acres, largely planted with potatoes, at the Sandy Lake post;[8] and Governor Sibley declared that Joseph Renville was the first stock-raiser in Minnesota, since he had owned "sheep by the hundreds and cattle by the score" at Lac qui Parle more than twenty-five years prior to 1856.[9] Agriculture was also practised more or less about the forts, missionary stations, and Indian agencies, notably at Lake Calhoun, Red Lake, and Long Prairie.[10] The lumbermen likewise at times found it expedient not only to cut wild hay, but also to plant potatoes, corn, and occasionally oats, for use in their logging camps the following winter.[11] Such incidental agriculture evidently accounted for the farm products reported from St. Croix County at the census of 1840.

Curiously enough, the first permanent settlers who sought to live by agriculture in Minnesota came from the wilderness to the north, being refugees from the Selkirk settlement in the Red River Valley of Canada. The first agricultural settlers reached that district in 1812, by way of Hudson Bay and the Nelson River. Until 1821 the settlement was distracted by war between the Hudson Bay and the Northwest companies; later, notably in 1826, came disastrous floods; and then followed plagues of grasshoppers. In 1821 about 166 Swiss, mostly French-speaking, joined the colony, only to find conditions very different from what they had expected. As a result, five families found their way to Fort Snelling that same autumn, thirteen families came in 1823, and more year by year, every disaster being the signal for a fresh exodus. Thus, after the flood of 1826 came Abram Perret (Perry), Joseph Rondo, Benjamin and Pierre Gervais, Louis Massie, and others, most of whom eventually settled in St. Paul. In 1831 it is recorded that about twenty arrived, and, in 1839, forty or fifty cartloads.[12] Altogether, this immigration is estimated at 500, down to 1836, and 200 more from 1836 to 1842; though half or more went down the river to Galena, St. Louis, or Vevay, Indiana.[13] In addition, there was a considerable settlement of half-breeds from the old fur posts on the Red River around Pembina, which was originally supposed to be on Canadian soil. These, however, practised agriculture only incidentally, their main reliance being buffalo-hunting.[14]

The first Selkirk refugees were permitted to settle, build houses, and establish farms on the Fort Snelling reservation. In 1837 there were 82 persons, mostly Swiss, in this settlement, and they had about 200 head of horses and cattle. In addition, there were 25 at Mendota and 50 at other trading posts in the immediate vicinity. On May 6, 1840, some two years after the opening of the region east of the Mississippi to settlement, all squatters were ejected from the reservation. Some of them settled on the site of St. Paul, at that time a place without a name; and in 1844 one of these (B. Gervais) founded Little Canada, an agricultural colony nine miles north of St. Paul.[15] This has remained a French community to the present day. In the meantime, about 1841, the first American farmers had settled at Red Rock, on the river several miles below St. Paul, and at Cottage Grove prairie (the Prairie Settlement), not far above the junction of the Mississippi and the St. Croix. According to General Sibley, Joseph Haskell and James S. Norris, both settlers in the Cottage Grove district, were "the first farmers who made Minnesota their home; and who demonstrated that our lands are equal to any others in the west for the production of cereals."[16]

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[6] *Ibid.*, IX, 317.
[7] Stanchfield, Daniel, *Pioneer Lumbering on the Upper Mississippi* (*Ibid.*, IX, 329).
[8] Le Duc, W. G., *Minnesota Year Book for 1851*, 29.
[9] Annual Address before the Historical Society in 1856 (*Minn. Hist. Soc. Coll.* I, 466).
[10] *Journal Minn. House of Rep.*, 1857-58, 47; Le Duc, W. G., *Minnesota Year Book for 1851*, 28, 42; Bond, J. W., *Minnesota and Its Resources*, 213; *Minn. Hist. Soc. Coll.* II, 124.
[11] Bond, *ut supra*, 86.
[12] *Minn. Hist. Soc. Coll.* II, 124, 138; VI, 88-89.
[13] Williams, J. F., *History of St. Paul*, 42; *Minnesota in Three Centuries*, II, 76.
[14] *Journal Minn. House of Rep.*, 1857-58, appendix, 79.

The census of 1849

On June 1, 1849, the organization of the Territory of Minnesota was formally proclaimed, and in accordance with the provisions of the territorial constitution, a census of the inhabitants was ordered, as of June 11, 1849. The territory included not only the present state, but also all of the Dakotas east of the Missouri and White Earth rivers. For lack of other officials, the enumeration was made by the sheriff of St. Croix County—the only organized county in the territory. Indians were supposed to be excluded, but half-breeds were included. Judging from the population reported west of the Mississippi, where white settlement was confined to traders and missionaries, and from various oral traditions, it would seem that the census was considerably padded.[17] Even the troops and other persons in the forts were all included. As officially reported, there were 3,067 males and 1,713 females, a total of 4,780 persons, in the territory (Appendix, Table II). It may, however, be doubted whether the actual population, including half-breeds living apart from their tribes, reached 2,500; and it has been estimated that the white population, exclusive of mixed bloods, did not exceed 1,000.[18] According to the census there were on June 11, 3,740 persons within the present boundaries of Minnesota, counting the Pembina settlement as in Dakota; or 4,057, as estimated by the Minnesota Commissioner of Statistics.[19] Of this number 2,879 were found in the ceded district east of the Mississippi, including 211 in the Lake St. Croix precinct and an uncertain number, not greater than 194 (shown by the 1850 census) in Little Canada. The number in these two districts, where agriculture predominated, was thus under 400.

Minnesota according to the census of 1850

The census of 1850 gives the population of June 1 of that year; but the agricultural returns necessarily represent the crops of the 1849 growing season (Appendix, Table III). The same relation to crop seasons also obtains as to subsequent censuses.

The territorial legislature at its first session in 1849 had divided the territory into nine counties, of which only three—Washington, Ramsey, and Benton—comprising the ceded land east of the Mississippi, were organized. The population reported in the territory as a whole was 6,077; an apparent increase during the year of 1,297 persons or 27 per cent. Using the corrected figures for 1849, the increase appears as about 3,500 or 140 per cent. The population within the area of the future state was subsequently estimated as 5,354.[20] The three organized counties included the majority (3,701) of the population, most of the others being scattered along the Mississippi and Red rivers, approximately as shown on the accompanying map.

The census of 1850 apparently does not distinguish consistently between country and town population, though the three largest villages, St. Paul, Stillwater, and St. Anthony, had together 2,271 inhabitants, or 37 per cent of the total population (Appendix, Table III, note 6). However, since places under 2,500 are counted as rural, and St. Paul contained only 1,112 people, the map shows at once the total population and the rural population as of June 1, 1850. The nativity of the inhabitants (Table III, items 8-11) indicates that while the half-breed element was undoubtedly large among persons of Minnesota and Canadian birth,[21] there were at least 3,000 or 50 per cent of whites from other states and foreign countries. This was the element which was beginning to furnish an agricultural population.

The number of men reported as farmers was 340; but this number included 77 in St. Paul,[22] and must have included others elsewhere, who were either in transit or for other reasons not actually farming. The total land in farms was 28,881 acres, the improved land 5,035 acres, and the number of separate farms reported was 157. This would give on the average 183.95 acres, including 32.07 acres of improved (plowed or enclosed) land, per farm. It is, however, evident that the 36 Itasca "farms" of 2.5 acres each probably represent a wild guess, since there were only 23 dwellings in that county. In any event, if these clearings existed, they were mere gardens and therefore not to be averaged with genuine farms. Deducting these 36 parcels in Itasca, there remain 121 farms containing 28,781 acres in all and 4,935 acres improved. On this basis the average farm contained 238 acres, including about 40 acres of improved land. The larger farms were found in Ramsey, Benton, and Washington, where real farming had begun; and the largest of all (339 acres) in Washington, which had 58 per cent of the improved land (Fig. 38). Outside of these three counties, the farms evidently consisted for the most part of small fields, gardens, and pastures about the trading, military, and missionary posts.

The live stock comprised chiefly horses and work oxen, though some milch cows were reported, especially in Washington and Pembina counties. The considerable value of live stock in Pembina, together with the insignificant acreage of improved land there, indicates a hunting and pastoral, rather than agricultural, mode of life.

The crop season of 1849 was fairly cool and extraordinarily wet (Figs. 69, 70). According to the census the yield of all field crops was 81,911 bushels (Table III, item 37). Using the same unit as in later years (1 dot = 10,000 bushels), the entire oat crop would be represented by three dots, the potato and corn crops each by two dots, and the joint yield of all crops in the entire territory by eight dots. The bulk of the crops naturally came from Washington and Ramsey counties. Wabashaw (as then

[15] Le Duc, W. G., *Minnesota Year Book for 1851*, 31.
[16] Address in 1856 (*Minn. Hist. Soc. Coll.* I, 478); Williams, J. F., *History of St. Paul*, 115-116; Bond, J. W., *Minnesota and Its Resources*, 57.
[17] Williams, J. F., *History of St. Paul*, 228, note.
[18] *Ibid.*, 207.
[19] *Second Annual Report of the Commissioner of Statistics for 1860-61*, 97.
[20] *Ibid.*, 97.
[21] In 1860 the Indian population (civilized), which consisted chiefly of mixed bloods, was reported as 2,369; and the Minnesota Commissioner of Statistics at the time thought this number should be increased to 3,475. (*Ibid.*, 107-108; and *Preliminary Report on VIII Census*, 266.)
[22] Le Duc, W. G., *Minnesota Year Book for 1851*, 26. This is one of several statements attributed to the census by contemporary writers, but not found in De Bow's edition of the census.

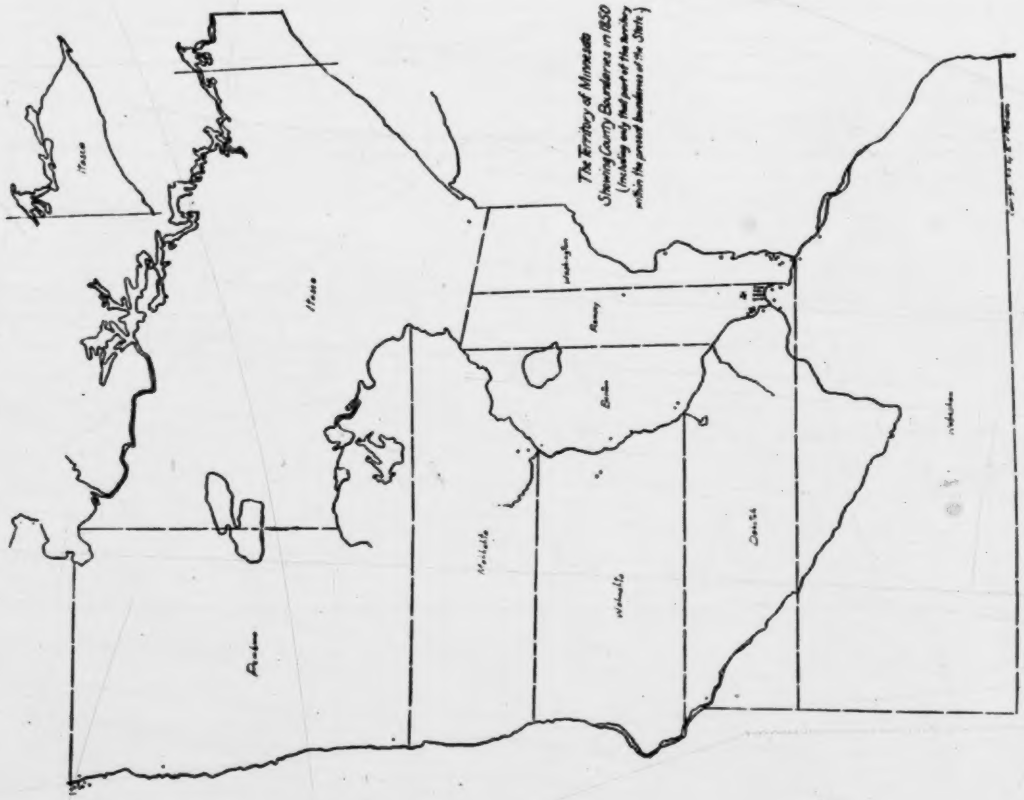
The Territory of Minnesota
Showing County Boundaries in 1850
(Including only that part of the territory within the present boundaries of the State.)
Itasca
Itasca
Pembina
Mahkahto
Wahnahta
Dakotah
Benton
Ramsey
Washington
Wabashaw

Figure 37. Approximate distribution of population in Minnesota at the census of 1850. (Each dot represents 100 persons or major fraction thereof.) (Based on Table III)

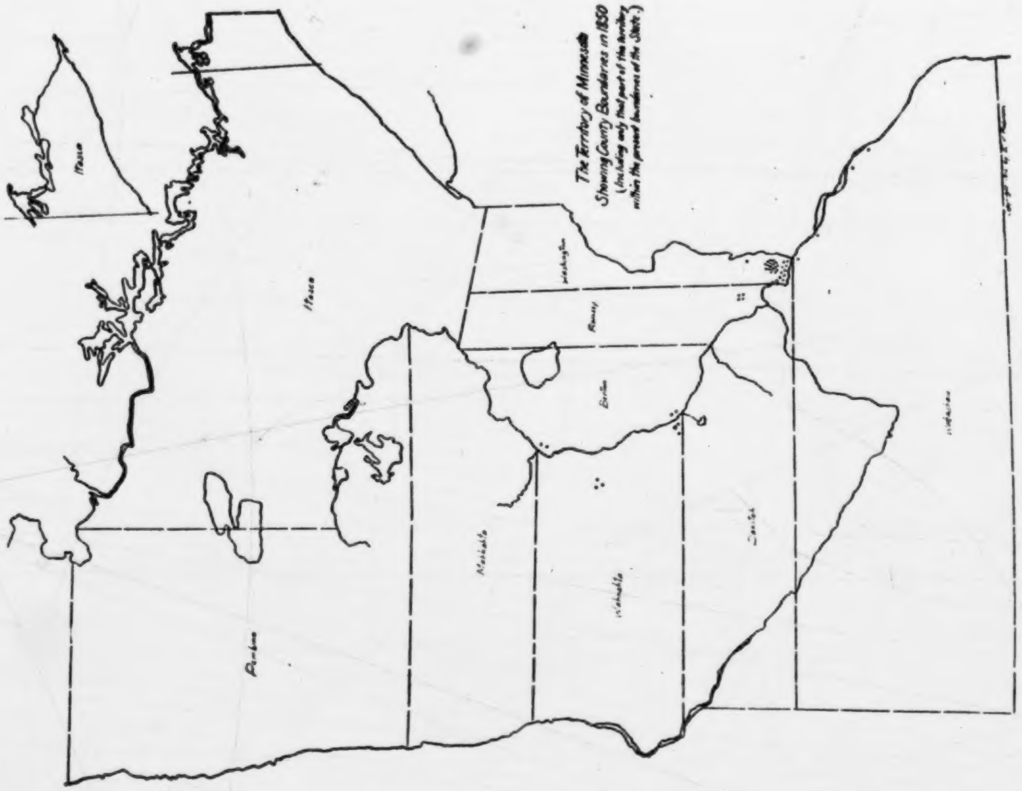
The Territory of Minnesota
Showing County Boundaries in 1850
(Including only that part of the territory within the present boundaries of the State.)
Itasca
Itasca
Pembina
Mahkahto
Wahnahta
Dakotah
Benton
Ramsey
Washington
Wabashaw

Figure 38. County names and boundaries and approximate distribution of improved farm land according to the census of 1850. (Each dot represents 100 acres or major fraction thereof.) (Based on Table III)

spelled) ranked third, in spite of the land there being unceded, probably by reason of the mission and trading posts along the Mississippi. In Washington County market-gardening had begun, in a small way, to supply the adjacent towns. In fact the district in Washington County extending from Douglas Point to Red Rock and Cottage Grove, easily accessible by water both to St. Paul and Stillwater, was the first center of commercial, as distinguished from self-sufficing, agriculture in Minnesota. Thus, under date of 1853 we read: "If the traveler wants to see what the practical farmer can do in Minnesota, let him ride down to Cottage Grove . . . . on the tongue of land extending down between the St. Croix and the Mississippi. The farmers there raise more oats, roots, everything that is good to eat, than they have any use for, and they sell a handsome surplus every year to St. Paul and Stillwater."[23]

The relative importance of various crops in 1849, as reported by the census of 1850, is shown in the following diagram.

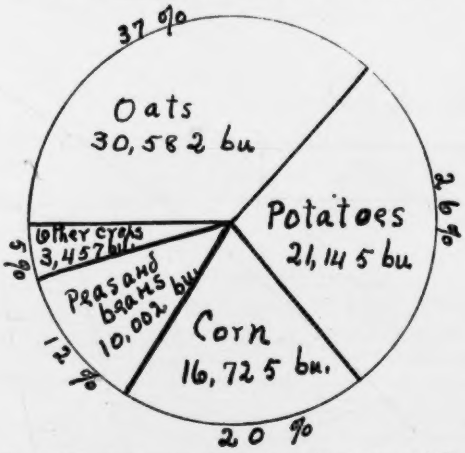

Figure 39. Field crops according to the census of 1850, showing the yield in bushels for the 1849 crop season and the percentage which each formed of the total (81,911 bushels). (Based on Table III)

The crops grown were thus chiefly of a character suited to local use. Wheat, the great market crop of later decades, had not yet come into vogue, the entire yield being only 1,401 bushels.

First grist-mills

Gristmills for local use were a feature of frontier life in Minnesota as elsewhere. In some cases they were driven by the wind, though usually by water or by steam. After the government mill at St. Anthony Falls (1823), the earliest gristmills in Minnesota were those built at Little Canada in 1844 and at Afton, near Cottage Grove, in the winter of 1845-46. These mills largely ground corn and other coarse grains, and were very small affairs. The census of 1850 reported only one gristmill in Minnesota having a product valued at $500 per year, smaller establishments not being counted (Table III, 44).

Development of agriculture, 1850-1857

During the fall of 1849 the first considerable farm (Russell's) had been opened above the Falls of St. Anthony, near Sauk Rapids.[24] Others followed rapidly in 1850 and thereafter, when the *Governor Ramsey* had begun to make trips on the upper river. As early as June, 1850, the census reported 20 holdings classed as farms in Benton County. In 1851 there is a record of three farms along the river, between the falls and the mouth of the Rum River, and others at Belle Prairie and Gull Lake.[25] In December, 1852, Captain Todd, the commandant at Fort Ripley, addressing the first session of the Benton County Agricultural Society, described in detail the management of two additional farms, besides that of Russell at Sauk Rapids.[26] On all, mixed farming rather than any one-crop system prevailed; though spring wheat was proving more dependable than winter wheat, and for the same reason, small grains were beginning to be preferred to corn.

During 1850 the Brophy settlement was begun around Lake Johanna, northeast of St. Anthony;[27] and the next spring much of the prairie between St. Paul and St. Anthony passed under the plow.[28] Owing to the proximity of markets in St. Paul and St. Anthony, agriculture here took on a more intensive character, the farms being relatively small and market-gardening an important feature on many of them. A nursery was also established between the cities. As a result, land in this district was already held at prices much above the average.[29]

In 1851 were negotiated the treaties of Traverse des Sioux and Mendota providing for the cession to the United States of substantially the southern half of Minnesota, west of the Mississippi (Fig. 36). Steamboat excursions up the Minnesota in the summer of 1850, added to the reports of the fur traders, had already made known the character of the country; and without waiting for the ratification of the treaty (June 26, 1852) a rush of settlers into the new cession began. The site of Minneapolis was occupied, and farmers spread as far west as Minnetonka. The valleys of the Root, Zumbro, and Cannon rivers, entering the Mississippi from the west, served as highways into the interior, especially through the driftless district where the valleys are better aggraded. The site of Winona, which became the fourth city in the State, was likewise determined by the convergence of a number of small valleys, offering easy routes on to the farming lands on the plateau. By the close of 1852 the west bank of the Mississippi was lined with villages and there were considerable settlements in the tributary valleys.[30] At the same time steamboats and other craft navigating the Minnesota River were crowded with settlers going into the south central region, and town sites were being established in all sorts of locations. The rush of settlers and the violence of speculation both increased still further in 1854, after the Sioux had finally retired the preceding year to their reservation on the upper Minnesota (Fig.36). This movement was stimulated, not only by the opening of such a vast area of fertile land, but also and especially by the great excursion up the river on the completion of the railroad from Chicago to Rock Island.[31] For the crop season of 1854 there were estimated to be 15,000 acres under tillage. This year also saw the first agricultural fair, held in Hennepin County.[32] By this time the territory was in the grip of a real estate "boom" which spread and grew with prodigious rapidity until the panic of 1857.[33]

[23] Bond, J. W., *Minnesota and Its Resources*, 34.
[24] *Minnesota in Three Centuries*, II, 446.
[25] Le Duc, W. G., *Minnesota Year Book for 1851*, 27-28. Bond, J. W., *Minnesota and Its Resources*, 46-49.
[26] *Ibid.*, 169-172.
[27] *Ibid.*, 362.
[28] *Ibid.*, 43.
[29] *Ibid*, 140-141.
[30] *Ibid.*, 50.
[31] Blakeley, Capt. Russell, *Advent of Commerce in Minnesota* (*Minn. Hist. Soc. Coll.* VIII, 393-400).
[32] *Second Annual Report of Commissioner of Statistics for 1860-61*, 55; Message of Governor Gorman, *Council Journal*, 1855, p. 41
[33] *Second Annual Report of Commissioner of Statistics for 1860-61*, 103.

Increase of population, 1850-1857

The substantial facts underlying this speculative frenzy were, first, that population was actually increasing rapidly, and, second, that most of the newcomers were turning to agriculture. From 4,780 on June 11, 1849, and 6,077 on June 1, 1850, the population of the territory increased to 20,000 before the opening of navigation in 1853[34] and 30,000 by January, 1855,[35] according to the best estimates; while the actual population shown by the territorial census was 53,600 during the summer of 1855,[36] and 150,037 in 1857, prior to the admission of Minnesota as a state.[37] It thus appears that from 1850 to 1854, when immigrants had to make an eight or ten days' drive by wagon from Milwaukee or Chicago to Galena, the increase of population in Minnesota was at the rate of approximately 5,000 a season; but beginning with 1854, when railroads from the east reached the Mississippi River, and continuing till the panic of August, 1857, the increase rose to about 35,000 a year.

Importation of food stuffs

Owing to the rapid growth of the towns and the lumbering industry, agriculture was for a time unable fully to supply the home market. Thus, it is recorded that during the winter of 1850-1851, the following scale of prices prevailed in St. Paul: flour, $7 a barrel; potatoes and oats, 50 to 75 cents a bushel; beef, 8 cents, pork, 10 cents, lard, 14 cents, butter, 25 cents a pound; and eggs, 25 cents a dozen. Some of these prices look modest enough to-day, but on the strength of them it was asserted that "farming is and must be a very profitable business in Minnesota. For their produce, farmers will have for years a home market and high prices."[38] Again, some three years later, under date of April 10, 1853, we encounter a similar statement: "Look at our prices current (in St. Paul) at this time, before the arrival of the first boat from below with *our supplies*: flour, six dollars per barrel; oats, fifty-five and sixty cents per bushel; and potatoes, seventy cents. Butter twenty-five cents per pound, and eggs and poultry not to be had for love or money."[39] As late as 1853 one of the writers desirous of inducing immigration placed his principal emphasis on potatoes and oats, adding, however: "No one competent to judge doubts the efficacy of Minnesota as a wheat-growing region, although this crop has not been thoroughly tested as yet."[40]

This failure of Minnesota for some years to feed herself was even made a ground of attack, especially by Horace Greeley, editor of the powerful *New York Tribune*, who alleged, as proving the worthlessness of the territory, that it "imported loafers, the bread that they ate as well as the whiskey that they drank."[41] It may be surmised that Greeley objected to seeing northern settlers drawn off to Minnesota, especially after the Kansas-Nebraska Act of 1852, when (as he thought) their presence was sorely needed in Kansas and other border territory to insure the supremacy of the antislavery element. To offset these unfavorable reports, energetic efforts, in part at public expense, were of course made in Minnesota, notably by General Le Duc in 1853.[42] Nevertheless, Mr. J. J. Hill has recorded that even so late as 1856, when he first came to the territory, "it was still considered that Minnesota might be a good country for lumber; we had a few cranberries to sell (probably 150 or 200 barrels a year); and beyond that the fur trade."[43]

Minnesota becomes self-supporting

However, the great flood of immigration, which for several years had been pouring in, somewhat abruptly changed the economic character of the territory. As early as 1852 some 2,000 bushels of wheat were shipped from Hastings, but the destination is not recorded and may have been St. Paul.[44] Mr. J. J. Hill further reports: "The first wheat that I know to have been shipped from Minnesota was in 1857, and was raised on the Le Sueur prairie. . . . . In 1859 there were a few thousand bushels of wheat raised, principally about Le Sueur and St. Peter. It was shipped to St. Louis by boat. . . . . There was not enough to fully load a barge. . . . . In 1859 and 1860, all the grain was hauled in seamless sacks. . . . . Milwaukee was practically the market for all our grain."[45] It seems clear, however, from other contemporary evidence, that in 1857, the imports of foodstuffs largely exceeded the exports; and that, owing to poor crops,[46] the supply barely met the demand in 1858, when Minnesota became a state. In 1859, however, the harvest was excellent, except that much of the corn was damaged by frost; and the fall of that year saw the feeble beginnings recorded by Mr. Hill grow into an important export movement of farm products, as shown by the following figures:

TABLE 5.—SHIPMENTS BY PORTS IN 1859*

PORTS	WHEAT	OATS	CORN	BARLEY	POTATOES	TOTALS
	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels
Minneapolis and St. Anthony	......	13,000	33,000	......	46,000	92,000
St. Paul	12,848	30,000	5,376	......	50,000	98,224
Taylor's Falls	......	2,000	......	......	2,000	4,000
Stillwater	500	9,600	......	......	7,000	17,100

**First Annual Report of Commissioner of Statistics*, 1860, 155.

[34] Estimate in Bond, W. G., *Minnesota and Its Resources*, 22; for date compare 165.

[35] Message of Governor Gorman (*Council Journal*, 6 sess., 31, under date of Jan. 18, 1855).

[36] Message of Governor Gorman, Jan. 9, 1856, *Council Journal*, 7 sess., 257; and Williams, J. F., *History of St. Paul*, 359.

[37] *Second Annual Report of Commissioner of Statistics for 1860-61*, 98; *Minn. Ex. Doc.* 13, 1875.

[38] Le Duc, W. G., *Minnesota Year Book for 1851*, 49.

[39] Bond, J. W., *Minnesota and Its Resources*, 165.

[40] *Ibid*, 165.

[41] McClung, J. W., *Minnesota as It Is in 1870*, 92-93.

[42] Hill, J. J., *History of Agriculture in Minnesota* (*Minn. Hist. Soc. Coll.* VIII, 275-276).

[43] *Ibid.*, 276. About 4,500 barrels of cranberries were shipped during 1849 from St. Paul, Mendota, and Stillwater. (Seymour, E. S., *Sketches of Minnesota*, 157, 183; *Minnesota Chronicle*, Sept. 19 and 27, 1849; *Minnesota Pioneer*, Dec. 12, 1849 and Jan. 2, 1850.)

[44] *Minn. Hist. Soc. Coll.* VIII, 395.

[45] *Ibid.*, 276.

[46] Wheelock, J. A., *First Annual Report of Commissioner of Statistics*, 89, 100; Williams, J. F., *History of St. Paul*, 386, 391.

TABLE 5.—*Continued*

PORTS	WHEAT	OATS	CORN	BARLEY	POTATOES	TOTALS
	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels
Pt. Douglas	6,000	6,000	......	......	......	12,000
Hastings	49,477	59,400	......	......	3,000	111,877
Pine Bend	3,000	1,000	......	......	......	4,000
Newport	......	1,500	......	......	......	1,500
Red Wing	30,000†	......	......	......	......	30,000
Lake City	18,000	......	......	......	3,400	21,400
Wabasha	4,800	10,000	......	......	2,000	16,800
Reed's Landing	3,000	5,000	......	......	1,000	9,000
Minneiska	12,000†	......	......	......	......	12,000
Mt. Vernon	3,000†	......	......	......	......	3,000
Winona	177,000	35,000	......	9,000	6,000	227,000
La Crescent	15,000	1,000	2,000	......	2,000	20,000
Hokah	3,000	......	......	......	......	3,000
Brownsville	32,000	4,000	......	1,000	......	37,000
Lake Superior	......	......	......	......	1,000	1,000
Totals	369,625	177,500*	40,376*	10,000	123,400	720,901‡

In spite of the fact that, as previously noted, agriculture in Minnesota began in the Cottage Grove district, and the first considerable wheat shipments are stated to have come from the Minnesota Valley, wheat first became the leading crop in the southeastern section, along the Mississippi and adjacent to older wheat-raising districts, and spread thence toward the north and west. Thus, in 1859, as appears from the preceding table, Winona and the other ports in that vicinity showed the largest wheat shipments, while from St. Paul but little, and from Minneapolis no wheat at all, was shipped. There is also contemporary testimony to the effect that the leading primary wheat market was at first Rochester, then Red Wing, and finally (by 1871) Minneapolis, indicating a similar shifting of the principal area of wheat-farming.[47]

Flour manufacture kept pace with, or even outran, the wheat crop. The first custom gristmill at St. Anthony dated from 1851, though it was not adapted to wheat till the following year. About the same time similar mills began to appear in the new cession west of the Mississippi. The first merchant mill at St. Anthony was built in 1854. For several years thereafter the local supply of wheat was inadequate and some had to be brought either 100 miles by wagon from Wisconsin, or up the river from Iowa and Illinois. The mill, nevertheless, proved profitable because of the large local demand, the lower freight charges on wheat than on flour, and the cheapness of power. As late as 1857, flour appears still to have been imported;[48] but in 1858, before wheat exports had fairly begun, the mill at St. Anthony made the first recorded shipment of flour to eastern markets;[49] and in the exports of 1859 there is a record of 114 barrels of flour shipped by way of La Crosse and Prairie du Chien, 100 of these going to Boston at a freight rate of $2.25 per hundred[50] (Note ‡, Table 5). Concerning the first shipment, it is reported by one of those concerned: "It was not considered that Minnesota flour would be accepted as genuine, and to make it genuine it was branded Muskingum Mills, Troy, Ohio. . . . . . Within about three months after the first shipment the quality of the flour . . . . was so very much better than the . . . . flour of Ohio that we were compelled to change the brand. Since that time it has dated from Minnesota."[51]

Up to 1840 the economic basis of Minnesota had been the fur trade. By 1850 lumbering, though still in its infancy, was fast becoming the leading industry. The close of the decade 1850-1860 saw the new state an agricultural community solidly planted upon the soil.

Distribution of population in 1860

The full extent of the economic revolution accomplished in the preceding decade appears in the census of 1860. In no respect is the change more strikingly shown than in the number and distribution of the population, compared to 1850 (Fig. 40).

In 1860 there were sixty-four counties in place of nine; three towns (St. Paul, St. Anthony, and Minneapolis), each having over 2,500 population, while another (Stillwater) had 2,380 inhabitants; and the total population was 172,023 east of the Red River, against 6,077 in 1850 for the entire territory.

The distribution of the population shows clearly the influence of transportation routes, settlement being densest along the navigable portions of the Mississippi, Minnesota, and St. Croix, and varying inversely with the distance from these streams. Actually, the population was mostly gathered within from thirty to sixty miles (roughly a two days' drive) of the rivers, but the use of the county as the unit of tabulation renders it impossible to differentiate the areas of denser settlement within the

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**First Annual Report of Commissioner of Statistics*, 1860, 155. The totals printed in the commissioner's report are 164,500 for oats and 41,376 for corn, while the correct footings of the items are 177,500 and 40,376 respectively. While it is impossible to tell where the errors occurred, the county items are here accepted as correct and new totals calculated, in order to make the total balance.

†All grains, but principally wheat.

‡Other exports, mostly via La Crosse, Prairie du Chien, and Fulton, in 1859, were: ginseng, 203,000 pounds; cranberries, 10,300 bushels; bales of furs, 100; bales of buffalo robes, 403; hides and skins, 20,174 pounds; wool, 24 bales and 2,000 pounds; butter, 3,886 pounds; *flour, 114 barrels* (*Ibid.*, 108-109).

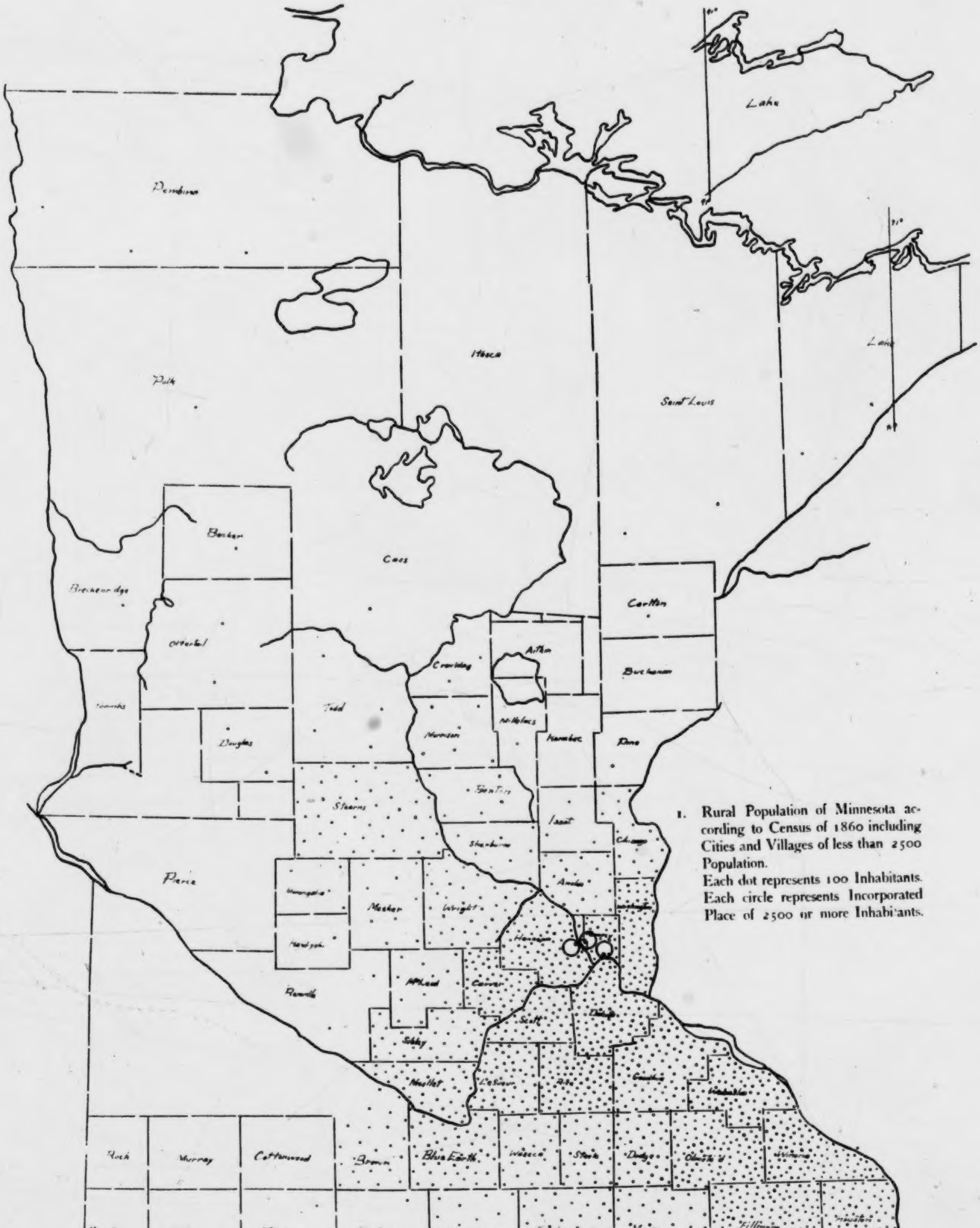
[47] Hill, J. J., *History of Agriculture in Minnesota* (*Minn. Hist. Soc. Coll.* VIII, 282).

[48] *First Annual Report of Commissioner of Statistics for 1859*, 121.

[49] Rogers, George D., *History of Flour Manufacture in Minnesota*. (*Minn. Hist. Soc. Coll.* X, Pt. 1, 38-39).

[50] Pillsbury, C. A., *American Flour* (Depew, *One Hundred Years of American Commerce*, I, 269).

[51] Hill, J. J., *History of Agriculture in Minnesota*. (*Minn. Hist. Soc. Coll.* VIII, 277).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Blue Earth
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Olmsted
Winona
Pipestone
Nobles
Jackson
Martin
Faribault
Freeborn
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Fillmore
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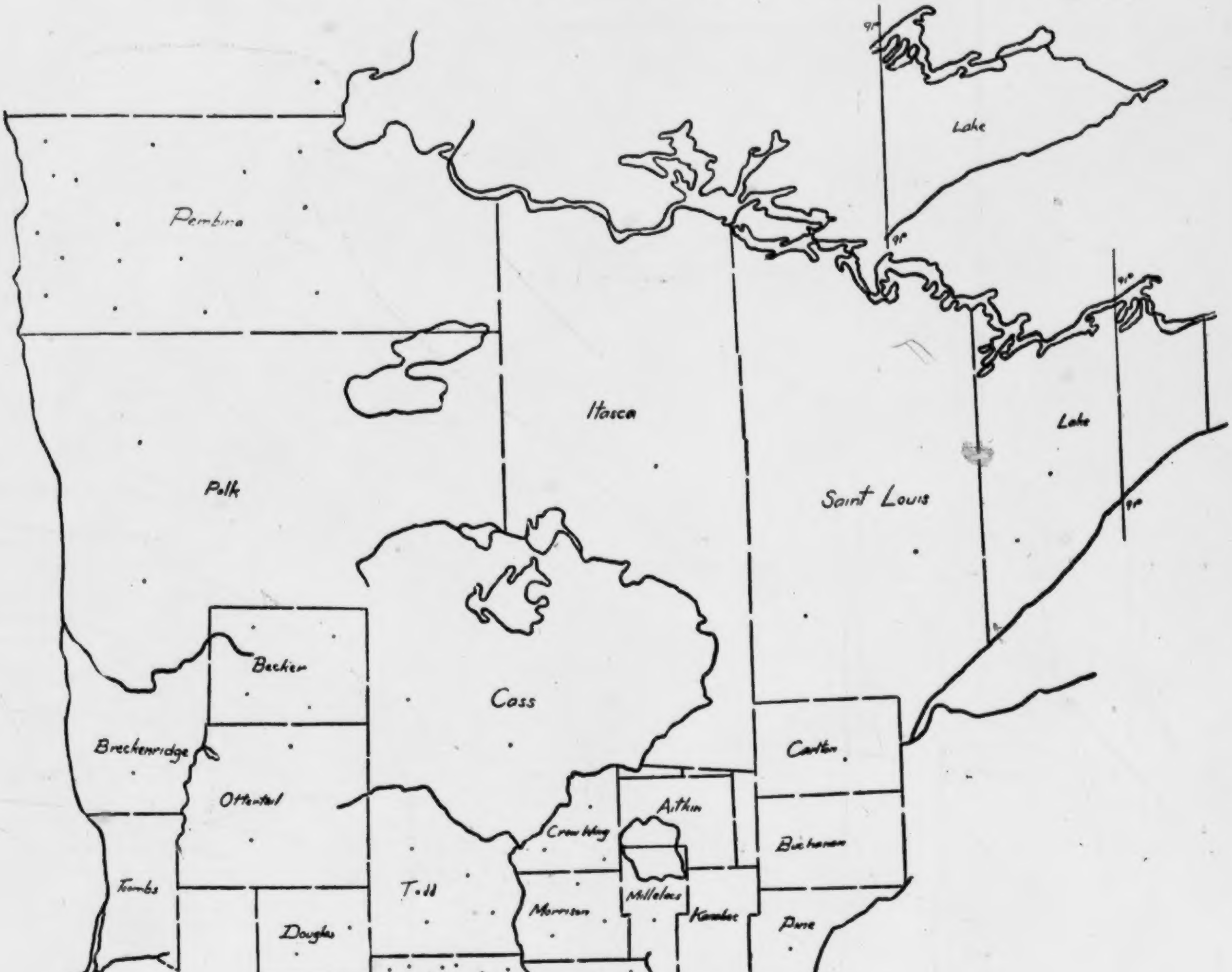
1. Rural Population of Minnesota according to Census of 1860 including Cities and Villages of less than 2500 Population.
Each dot represents 100 Inhabitants.
Each circle represents Incorporated Place of 2500 or more Inhabitants.

Figure 40. Rural population of Minnesota in 1860. (Based on Table XI)



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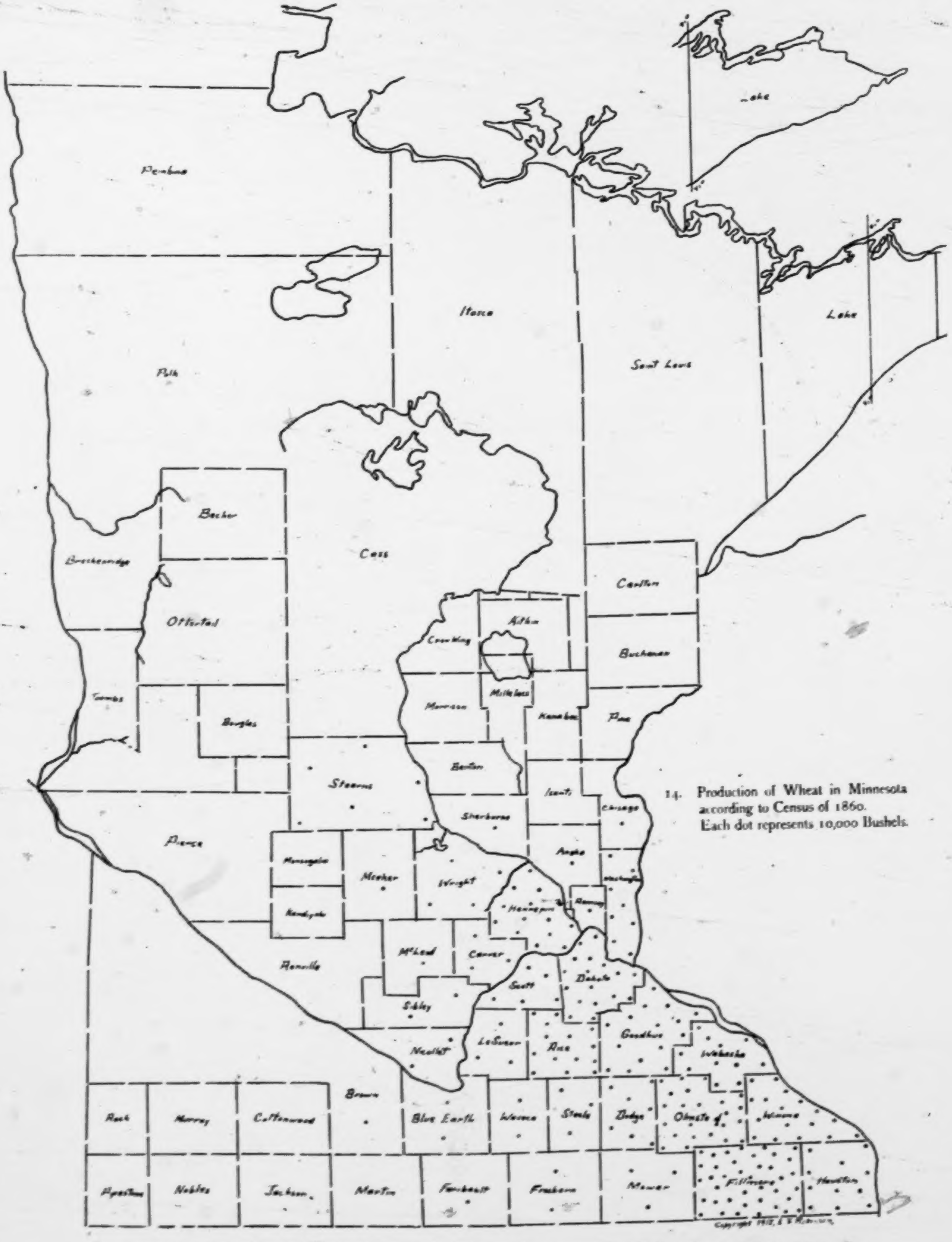
8. Country Population of Minnesota according to Census of 1860 excluding all Incorporated places. Each dot represents 100 inhabitants.

Figure 41. Population outside of incorporated places in 1860. (Based on Table XI)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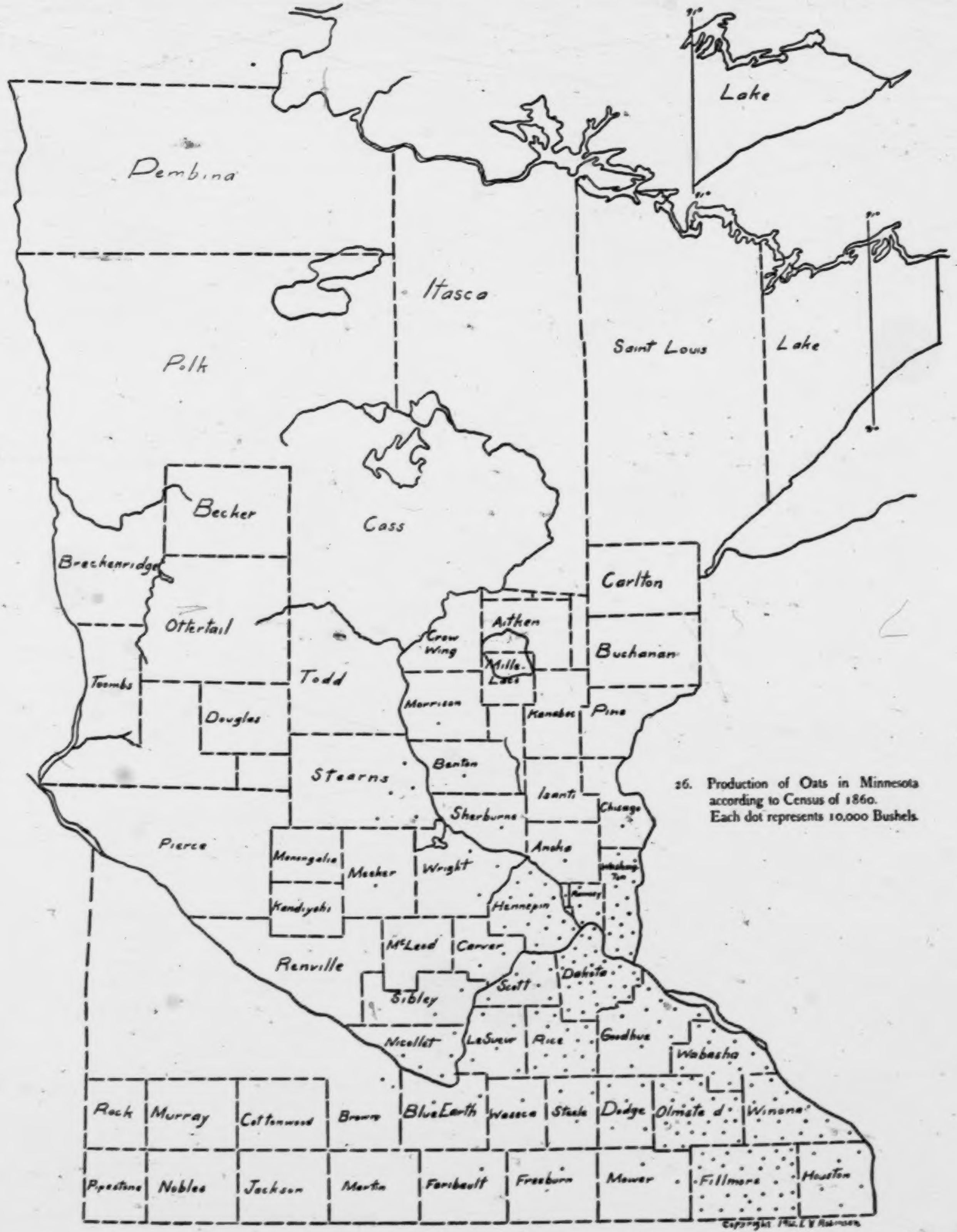
14. Production of Wheat in Minnesota according to Census of 1860.
Each dot represents 10,000 Bushels.

Figure 42. Production of wheat in Minnesota in 1859 according to census of 1860. (Based on Table XIII)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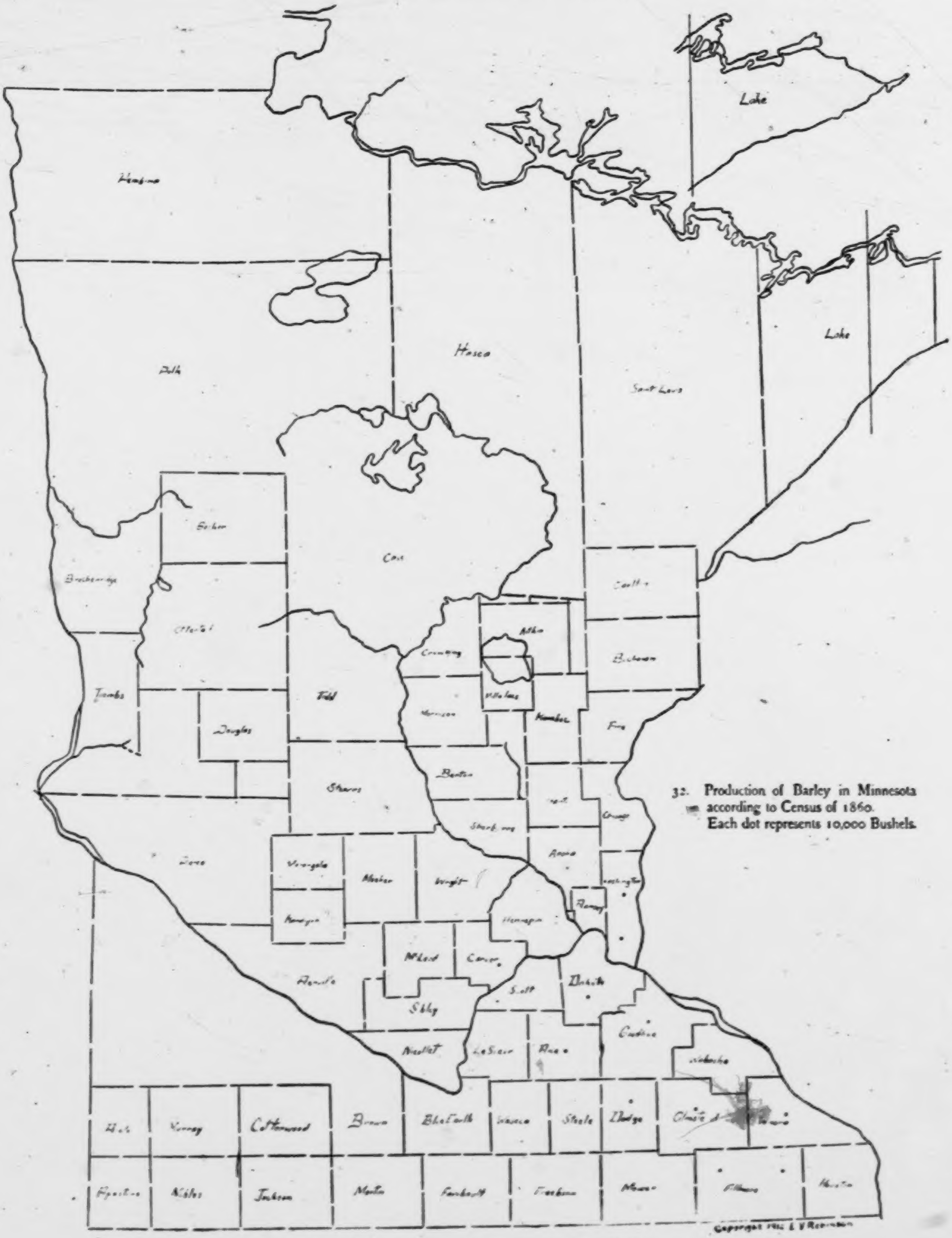
26. Production of Oats in Minnesota according to Census of 1860.
Each dot represents 10,000 Bushels.

Figure 43. Production of oats in Minnesota in 1859 according to the census of 1860. (Based on Table XIV)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32. Production of Barley in Minnesota according to Census of 1860. Each dot represents 10,000 Bushels.
Pierce
Anoka
Monongalia
Meeker
Wright
Washington
Ramsey
Kandiyohi
Hennepin
McLeod
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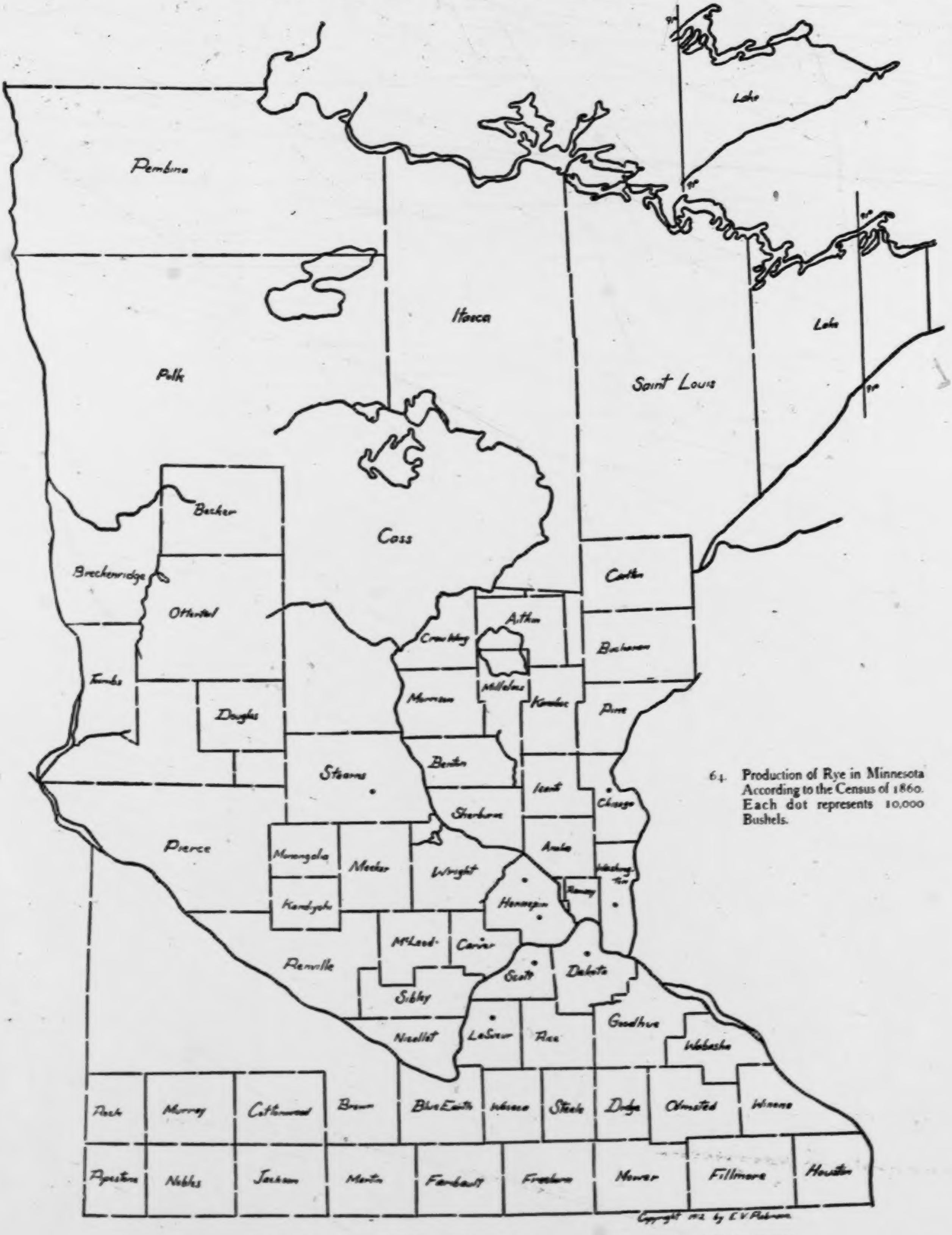
Figure 44. Production of barley in Minnesota in 1859 according to census of 1860. (Based on Table XVI)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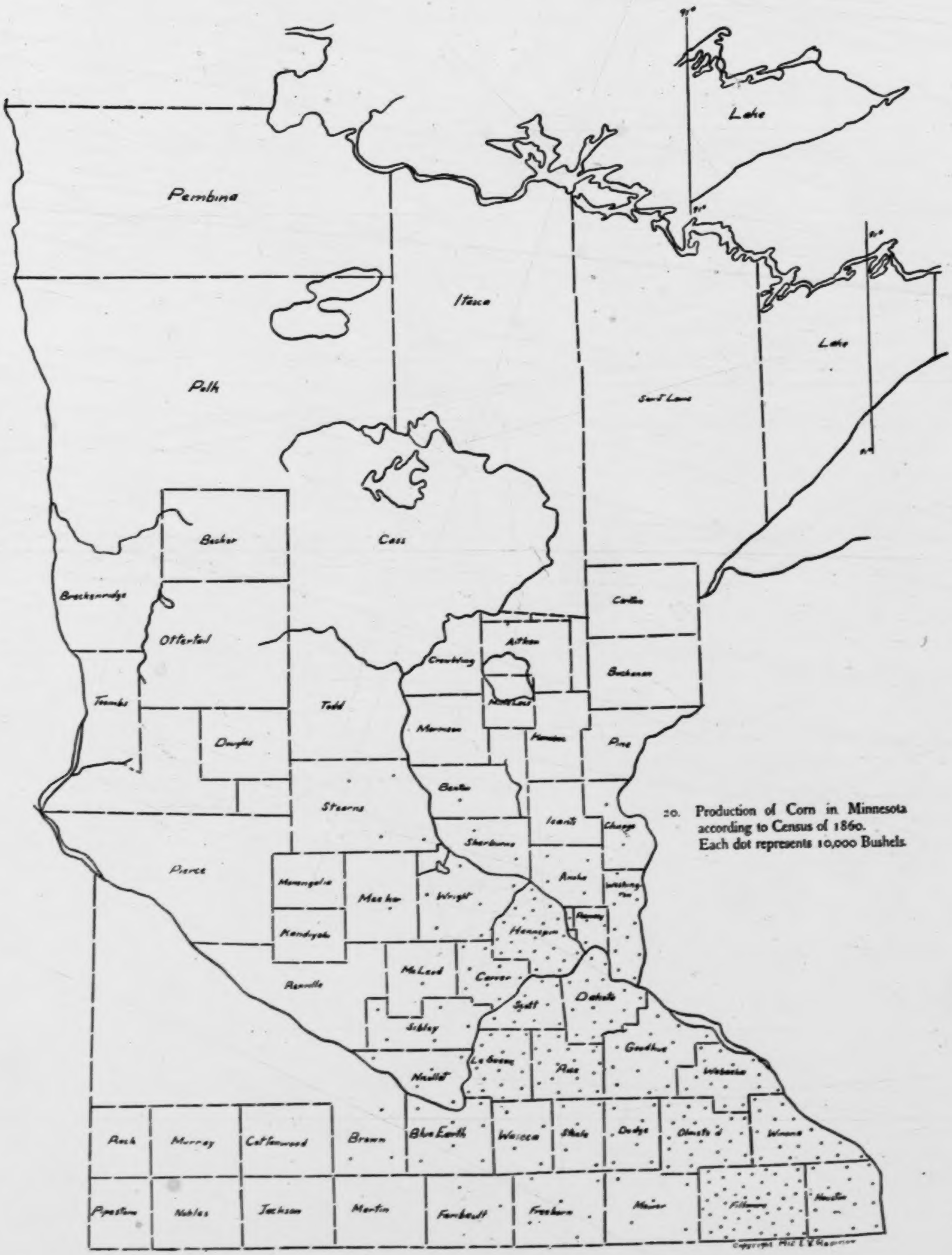
64. Production of Rye in Minnesota According to the Census of 1860. Each dot represents 10,000 Bushels.

Figure 45. Production of rye in 1859 according to the census of 1860 (Based on Table XVII)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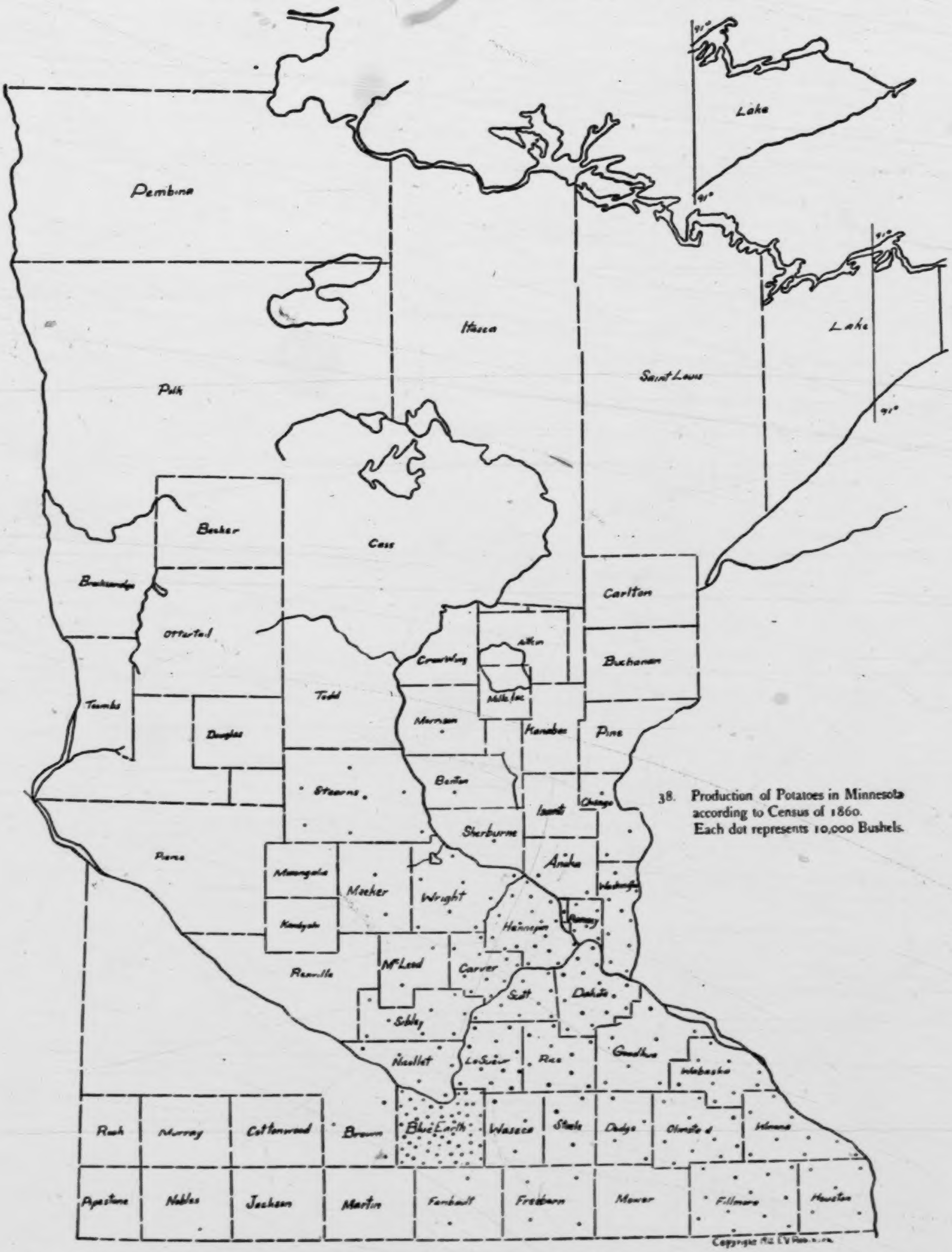
20. Production of Corn in Minnesota according to Census of 1860.
Each dot represents 10,000 Bushels.

Figure 46. Production of corn in Minnesota in 1859 according to census of 1860. (Based on Table XV)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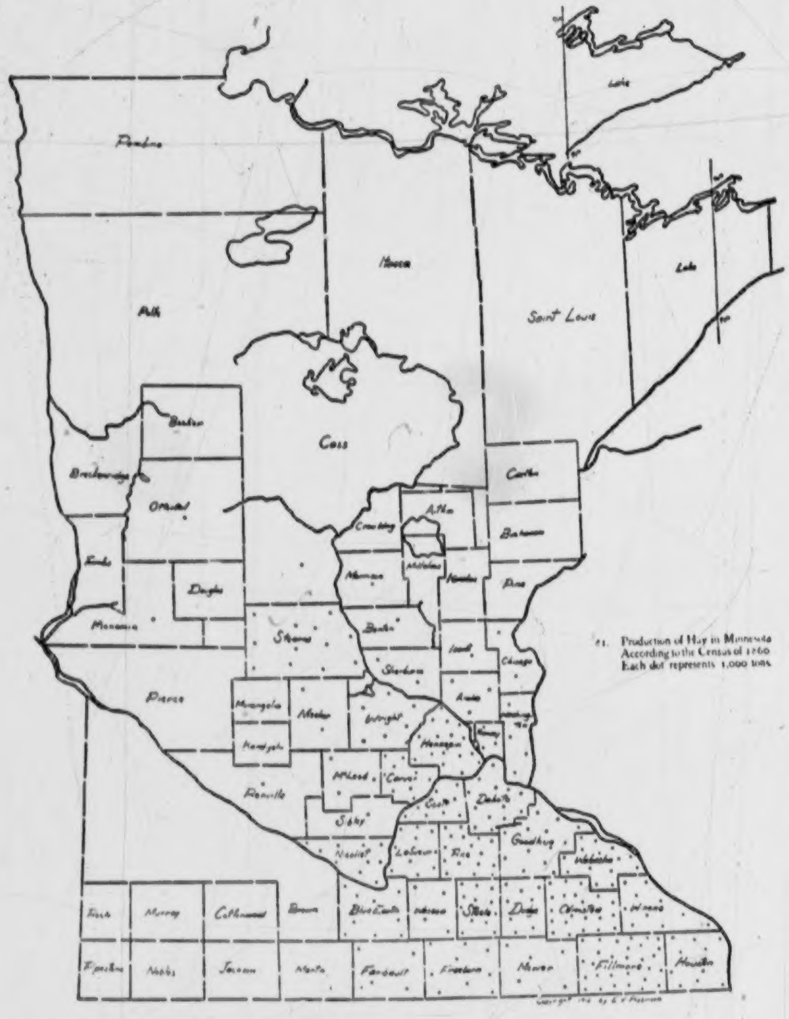
38. Production of Potatoes in Minnesota according to Census of 1860.
Each dot represents 10,000 Bushels.

Figure 47. Production of potatoes in Minnesota in 1859 according to the census of 1860. (Based on Table XVIII)


Production of Hay in Minnesota
According to the Census of 1860
Each dot represents 1,000 tons.
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Olmsted
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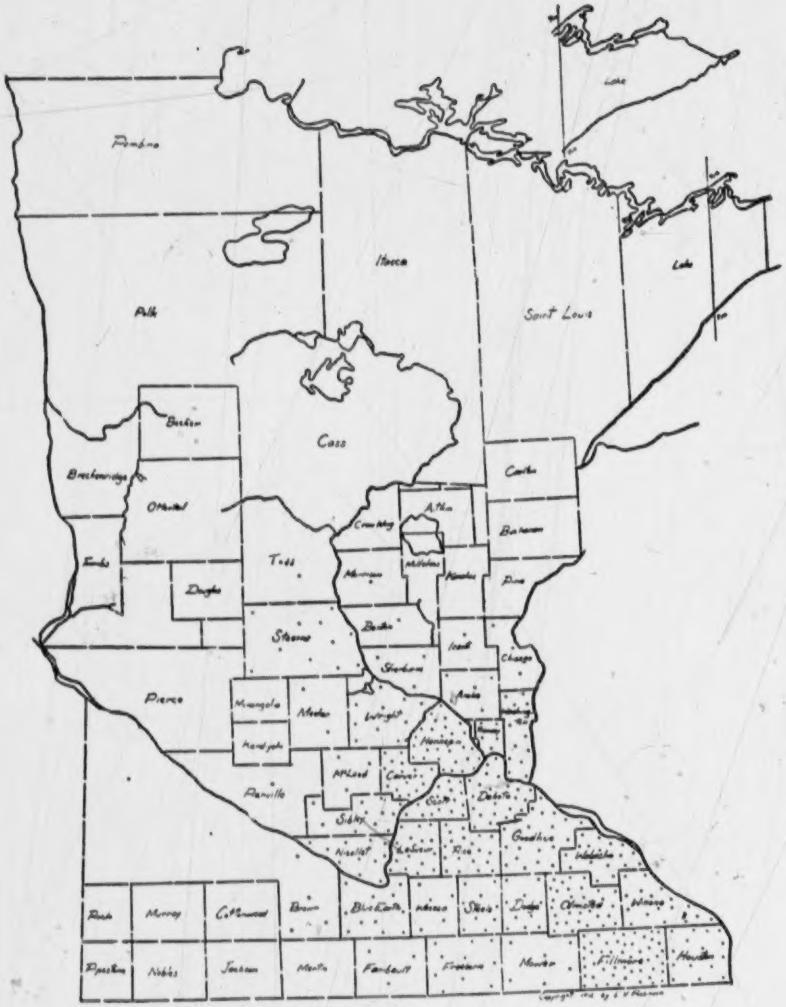
Fillmore
Houston

Figure 48. Production of hay in Minnesota in 1859 according to the census of 1860. (Based on Table XXII)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Pipestone
Nobles
Jackson
Martin
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Freeborn
Mower
Fillmore
Houston

Figure 49. Distribution of dairy cows according to the census of 1860. Each dot represents 100 milch cows or major fraction thereof. (Based on Table XXIV)

counties. The same difficulty is of course encountered in mapping the crop areas. The region between the Mississippi and the Minnesota, however, had been comparatively well settled, not only by infiltration from both directions, but also by reason of the military road running south along the divide (Fig. 30). The considerable settlement in Stearns County arose from the fact that the ordinary head of navigation on the upper river was at Sauk Rapids, and that at about this point the valley, curving toward the north, leads directly into the coniferous zone. As a result, agricultural immigrants, being forced to land at the rapids, spread over the region of mixed hardwood and prairie to the westward, along what was rapidly becoming the principal trail to the Red River Valley. East of the Mississippi settlement made relatively little progress except for the original agricultural district in Washington and Ramsey counties.

In order to eliminate, so far as possible, the influence of lumbering, manufactures, and commerce, another map has been prepared showing only the population in the open country, exclusive of all incorporated places, according to the census of 1860.

The distribution of population on this basis is somewhat more even as between the inhabited counties, though the effect of Sauk Rapids is again evident in Stearns County. Even this country population, however, can not be considered exclusively agricultural, for two reasons: first, many places which were in fact villages had not yet been incorporated; second, persons engaged in the fur trade, lumbering, or fishing were mostly found outside of incorporated towns.

Distribution of farm products in 1859 (Census of1860)

The wheat crop for 1859 (census of 1860) was more restricted in its distribution than the country population, most of it being grown in the two tiers of counties west of the Mississippi and south of the Minnesota, though it extended as far as Stearns County. The greatest density appeared in Fillmore and Olmsted counties, which are largely loess-covered (Fig. 42) and less dissected by streams than the river counties. The oat crop had substantially the same distribution, except that it was more strongly represented east of the Mississippi. Being grown chiefly for local use, oats was more important near the cities and the lumbering districts. In other respects its distribution followed that of the agricultural population, except on the extreme frontier.

The minor small grains, barley and rye, were grown in very limited quantities. Barley extended over about the same areas as wheat and oats, while rye did not appear in the southeastern district, aside from the Minnesota Valley.

Corn and potatoes, like wheat and oats, extended as far north as Stearns County; but true to their character as frontier crops grown for local consumption, they were also found at materially greater distances from the rivers than was wheat, or even oats. Corn had the preference on the extreme frontier because more easily planted and harvested on land imperfectly cleared or broken. It will be remembered, too, that an early frost had destroyed a considerable part of the corn crop of 1859, which is represented in this census (p. 44; Fig. 46). The great apparent density of potato-growing in Blue Earth County is manifestly an error in the census, since there was nothing before or afterwards, or in adjacent counties, to indicate such intensive cultivation of a bulky crop. Moreover, such a type of agriculture would be wholly inconsistent with the necessities of frontier existence. Only when large markets and cheap transportation are available, is it possible to carry on specialized potato-growing.

The production of hay, mostly wild hay, and the distribution of milch cows, corresponded closely to the distribution of the country population, extending beyond the areas devoted to cereals well into the wilderness. For the most part, both hay and milk served purely local uses, the dairy exports reported for 1859 being only 3,886 pounds of butter. The principal dairy product was butter (2,957,673 pounds), while the output of cheese was less than one tenth as much (199,314 pounds). These were prepared on the farm, butter and cheese factories being altogether unknown.

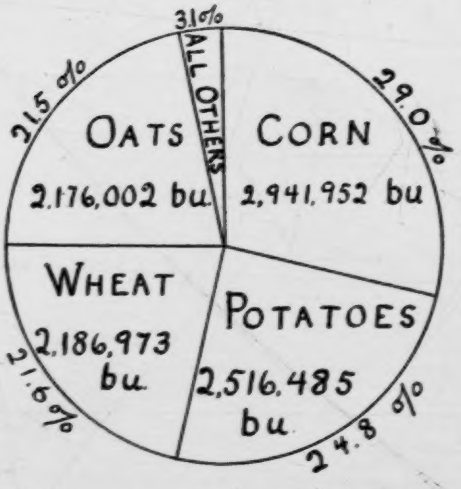

Figure 50. Field crops in 1859. (Based on Table IV)

Among the minor products dry or field peas and beans amounted to 18,988 bushels; and garden produce was valued at $94,704,[52] against $150 in 1850. The increase had occurred chiefly in Hennepin, Ramsey, and Wright counties, adjacent to the two cities. On the other hand, market-gardening remained insignificant in Washington County, where it had first appeared, notwithstanding the proximity of Stillwater and St. Paul. The development of small-scale farming in Little Canada, not far across the line in Ramsey County, presumably had some bearing on the matter. The census also reported $649 worth of orchard products, 140[52] pounds of hops, 1,983 pounds of flax fiber, 109 tons of hemp, and 38,938 pounds of tobacco. There were even somewhat bizarre agricultural experiments (suggesting what took place in New England in the seventeenth century), such as the production of 412 gallons of wine, 3,286 pounds of rice, and 52 pounds of silk cocoons. It would seem that Minnesota was thought to be almost, if not quite, in the banana belt.

Relative importance of crops

The relative importance of field crops in 1859 according to the census of 1860 appears from Table IV and Fig. 50.

Comparing Fig. 50 with Fig. 39 (p. 43), the most striking difference is seen to be the development of the wheat and corn crops. Wheat advanced during the decade from 1,401 to 2,186,973 bushels, which was 21.6 per cent of all field crops at the census of 1860; and corn, in spite of a serious crop failure, from 16,725, or 20 per cent, in 1849, to 2,941,952 bushels, or 29 per cent of all field crops, in 1859.

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[52] Corrected total. The census total for market garden produce, $174,704, shows a discrepancy of $80,000 compared to the items of which it purports to be the footing. Similarly, the correct total of the county reports for hops is 140 pounds instead of 132 pounds, as given.

Oats, the leading crop of 1849, stood fourth in 1859, after corn, potatoes, and wheat, although almost on a parity with wheat.

A similar advance of wheat is suggested by the development of manufactures. In place of four sawmills, producing lumber worth $57,800, as in 1850, there were in 1860 no less than 158 sawmills, with a product valued at $1,234,203. Even more striking was the increase reported in gristmills, namely, from one mill with products worth $500, to 81 mills grinding $1,289,665 worth of products. In short, by 1860, agriculture and the factories based thereon had superseded the forest as the chief source of wealth in Minnesota.

TABLE 6.—MANUFACTURES IN MINNESOTA ACCORDING TO THE CENSUS OF 1860

Industries	No. of plants	Capital invested	Cost of raw materials	Hands employed	Annual wages	Annual value of products
1. Agricultural implements	12	$19,650	$11,870	42	$14,364	$45,150
2. Wagons, carts, etc.	14	6,000	5,623	20	5,640	13,275
3. Total of implements and wagons	26	25,650	17,493	62	20,004	58,425
4. Gristmills	81	587,500	978,552	188	67,212	1,289,665
5. Meat packing	3	21,000	25,334	6	1,680	35,238
6. Total of grain and meat	84	608,500	1,003,886	194	68,892	1,324,903
7. Sawmills	158	1,334,120	593,607	1,146	363,612	1,234,203
8. Reworking of lumber	58	134,650	60,844	202	75,624	181,166
9. Total of lumber	216	1,468,770	654,451	1,348	439,236	1,415,369
10. All other manufactures	236	285,390	228,240	519	184,082	574,475
Total of all manufactures	562	$2,388,310	$1,904,070	2,123	$712,214	$3,373,172

While commercial agriculture, represented chiefly by wheat, was thus in the process of rapid development, the farmers in Minnesota were still, in the main, growing crops for their own use or at most for local consumption. This fact is evident from the percentage relation of the various field crops. Even the gristmills reported by the census were mostly custom mills, serving local patrons, as shown by the relatively small export of flour (Table 8).

Relation of population to land

The change from 1849 to 1859 in the relation of population to land and food supply clearly appears in Table 7 at the end of this chapter. From the last column, indicating the percentage of change, it is seen that the number of farms, total field crops, and value of all farm property, each increased approximately three times as fast as the total population. On the other hand, the average size of farms, calculated from the corrected total number of farms (17,999) obtained by footing the counties, fell from 184 to 150 acres. On the basis of the unsupported total number given in the census (18,181),[53] the average size of farms would be reduced still further, to 149 acres. The field crops, comprising the bulk of the local food supply, thus increased roughly three and a half times as fast as the population outside of incorporated places. This change marks the transition from dependence on outside food supplies to independence and the beginning of food exports.

TABLE 7.—CHANGES IN AGRICULTURE FROM 1850 TO 1860, ACCORDING TO THE CENSUS RETURNS

ITEMS	1850	1860	Percentage of Increase or Decrease 1850 TO 1860
1. Total population	6,077	172,023	2,730.7
2. Country population	3,806	122,530	3,119.4
3. Number of farms	157	17,999*	11,364.4
4. Land in farms (acres)	28,881	2,711,968	9,290.1
5. Improved land in farms (acres)	5,035	556,250	10,947.7
6. Average size of farms (acres)	184	151*	—17.9
7. Improved land per farm (acres)	32.0	30.9*	—3.4
8. Field crops (bushels)	81,911	10,114,677†	12,243.4
9. Value of farms (land and buildings)	$161,948	$27,505,922	16,884.4
10. Value of implements, etc.	15,981	1,018,183	6,271.2
11. Value of live stock	92,859	3,642,841	3,823.0
12. Value of implements and live stock	108,840	4,661,024	4,182.5
13. Value of all farm property	270,788	32,166,946	11,779.0
14. Value of lands and buildings per acre	5.61	10.14	80.7
15. Value of all farm property per acre	9.37	11.86	26.4
16. Value of all farm property per capita of the country population	71.17	262.52	268.9

[53] Either a typographical error or an enlarged estimate to allow for assumed omissions in the county figures.

*The total number of farms given in the census (p. 222) is 18,181, but the county totals (p. 205) foot up only 17,999, which number is here adopted.

†All cereals, peas and beans, potatoes (Irish and sweet), clover and grass seed and flaxseed, with census totals of wheat, barley, potatoes, clover and grass seed corrected to correspond to items standing over them in the census.

CHAPTER IV

PERIOD OF SPECIALIZED WHEAT FARMING 1860-1880

The course of wheat prices prior to 1860

Wheat being preëminently a market crop, its spread was powerfully affected by the upward course of wheat prices during the later fifties and early sixties.

In 1846, according to quotations collected for Madison, Wisconsin,[1] wheat had fluctuated around sixty cents per bushel and tended on the whole to decline until 1852 or 1853, but rose with extraordinary rapidity to $1.70 in 1855 (Fig. 51). This mountainous rise was presumably caused by the disorganization of the wheat trade and stoppage of supplies due to the Crimean War. The cause being temporary, the rise was followed by a sharp drop in 1856 and 1857, though not to as low a point. By 1858 minimum prices were again rising and this rise was accelerated on the outbreak of the Civil War.

In Minnesota reliable statistics date from 1881, when the Minneapolis Chamber of Commerce was organized; prior to that date reliance must be placed, as at Madison, on irregular quotations in the newspapers.[2] These indicate the same rise in the

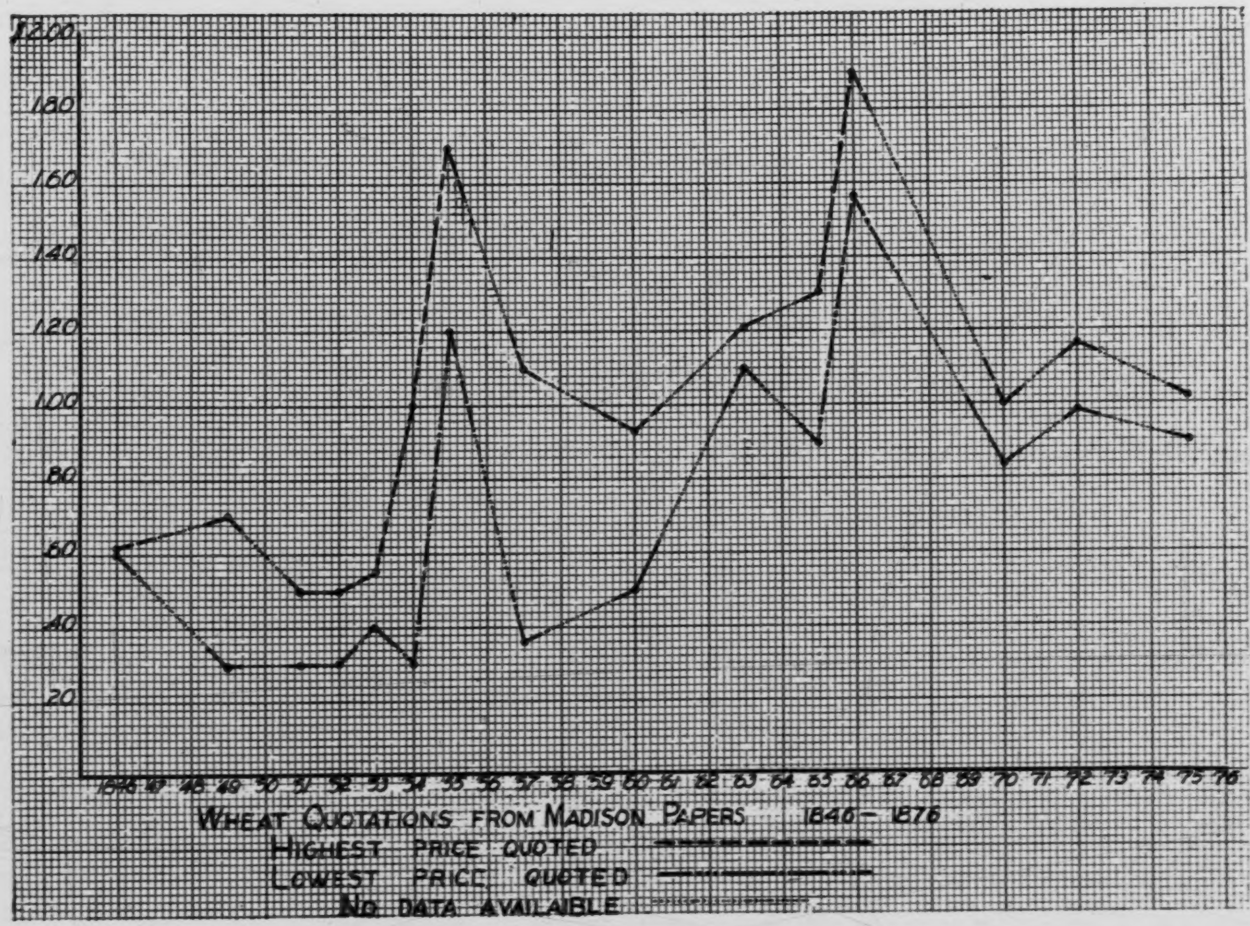

Figure 51. Wheat prices at Madison, Wisconsin, 1846-1876.[1]

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[1] Hibbard, B. H., *History of Agriculture in Dane Co., Wis.*, 133.
[2] *Second Annual Report Commissioner of Statistics, 1860-61*, 54-55. The 0.5 per cent represents "all other bushel crops."

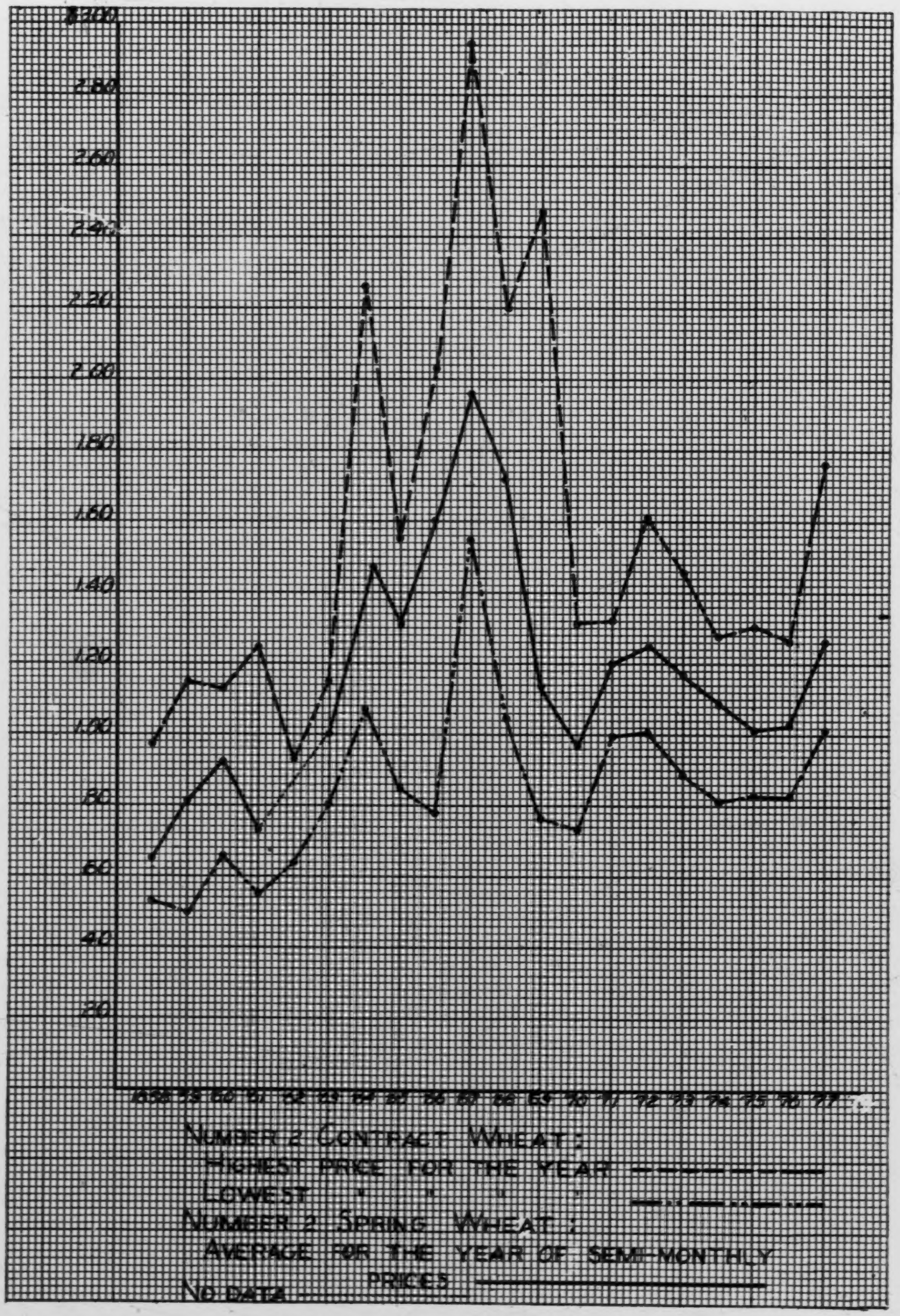

Figure 52. Wheat prices at Chicago, 1858-1877.[3]

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[3] "No. 2 contract," highest and lowest prices for year furnished by Secretary of Chicago Board of Trade. "No. 2 Spring Wheat," yearly average of semimonthly quotations for years 1858-1861 (see *Report Chicago Board of Trade*, 1858, 19; 1859, 41; 1860, 21; 1861, 21); for years 1863 to 1877, "Spring Wheat," grade unspecified (*Ibid.*, 1869, 34; 1876, 52; 1879, 58).

fifties, associated with the Crimean War; though, owing to the lack of quotations from 1854 to 1857, only the last phases of this rise are represented in the diagram (Fig. 53). Up to 1859 the prices were higher in Minnesota than in Wisconsin, presumably because the great influx of settlers compelled the importation of bread stuffs. Thereafter, with the increasing local crop, a decline set in which carried the price below the Madison and Chicago levels.

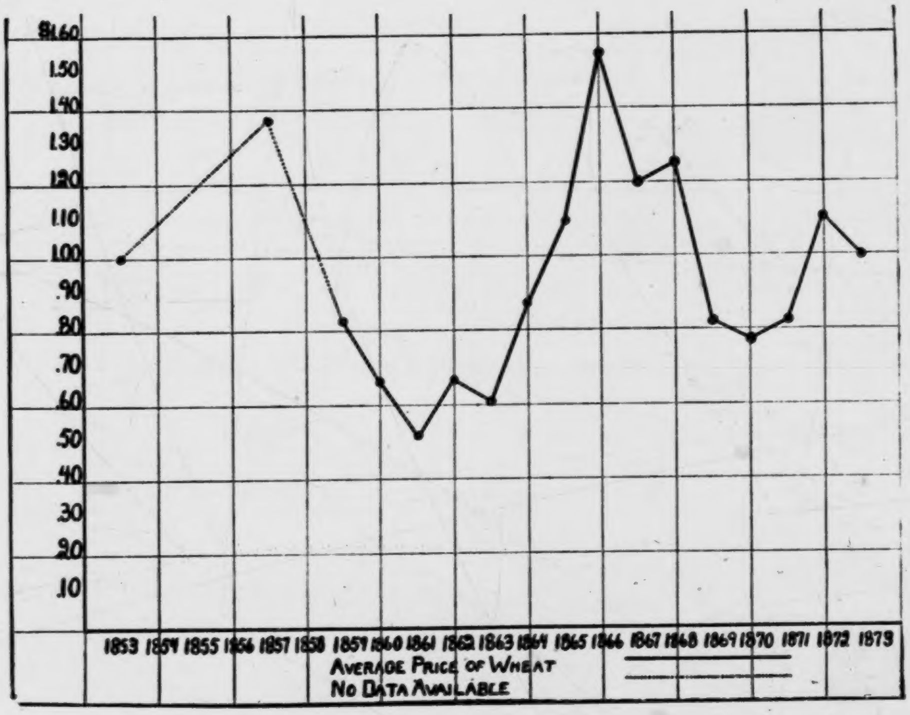

Figure 53. Wheat Prices at St. Paul and Minneapolis, 1853-1873.[4]

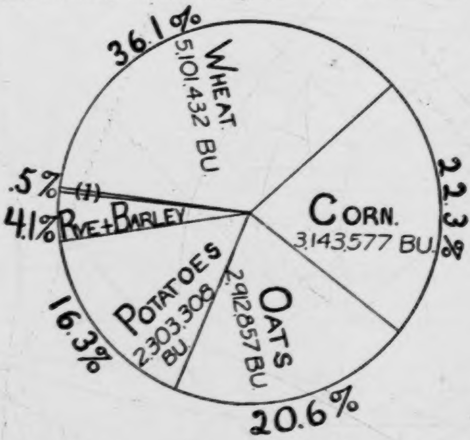

Figure 54. Comparative yield of bushel crops during the 1860 season. (Based on Table V.)

In Chicago the Board of Trade in 1858 established the first system of wheat grades, with a view to transportation and merchandizing in bulk. A comparison of these several sets of prices yields some interesting results. The Chicago quotations begin too late to reflect the price movements connected with the Crimean War; but for the later years they reveal the same general tendencies, at a higher level, as the quotations from Madison and St. Paul.

The 1860 crop season

Under the stimulus of rising prices the 1860 crop season showed a further advance of the tendency toward wheat farming revealed by the census for the crop season of 1859. This fact appears clearly in the reports of the local assessors to the state statistician.

From a comparison of Figs. 50 and 54 it appears that wheat had risen from 21.6 per cent in 1859 to 36.1 per cent in 1860 of the total bushel crops, and that rye and barley had also increased slightly. On the other hand, all the others had declined relatively, this shrinkage being particularly marked in the two crops least capable of profitable shipment, potatoes and corn. Contemporary evidence also indicates that in consequence of the large crops of 1859 and 1860 oats declined in price because, having greater bulk in proportion to value than wheat, they were less readily exported at a profit. This decline in price tended to a further reduction of the relative acreage sown to oats.[5]

These changes were reflected in the export trade of 1860, compared with that of the preceding season, as shown by Table 8.

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[4] Quotations collected from St. Paul and Minneapolis papers by Mr. Stanley Gillam, Research Assistant.

[5] *Ibid.*, 60.

TABLE 8—EXPORTS DURING 1859 AND 1860, EXCLUSIVE OF LUMBER[6]

ITEMS	1859	1860
1. Wheat, bushels	369,625	1,576,666
2. Flour, barrels	114	5,721
3. Rye, bushels	....	8,886
4. Barley, bushels	10,000	19,623
5. Oats, bushels	164,500*	185,195
6. Corn, bushels	41,376*	30,071
7. Potatoes, bushels	123,400	55,941
8. Hides, value	$15,000	$47,981
9. Wool, pounds	7,000	25,887
10. Butter, pounds	3,886	36,272
11. Ginseng, pounds	203,000	285,434
12. Cranberries, bushels	10,300	?
13. Furs, value	$160,000	$186,155
14. Buffalo robes, bales	403	?

The thing which stands out above everything else in the foregoing table is the increased exportation of wheat and flour. Butter, while still a minor item, gave some indication of future possibilities. On the other hand, there was a sharp drop in the shipments of corn and potatoes, and but slight increase in the movement of oats.

Congestion of water routes

Such an increase of shipments soon congested the transportation routes. In the spring of 1860, after the good crop of 1859, shipments began with a rush, indicating a large surplus carried over from the preceding harvest. The crop of 1860 was one of the largest in proportion to acreage ever harvested in the State; and as soon as this began to reach the river, a virtual blockade set in, which continued with greater or less stringency for a number of years. This condition has been graphically described by George B. Merrick, at that time a prominent steamboat man: "On the return trip . . . there was always a more or less assorted cargo, but the mainstay was wheat. . . . There was no question about getting it. Every boat got all the wheat it could carry, and the shippers begged, almost on bended knees, for a chance to ship five hundred sacks, or a hundred, or fifty—any amount would be considered a great favor. Wheat was shipped at that time in two-bushel sacks."[8]

The future development of commercial agriculture in Minnesota evidently depended in large part on the provision of more adequate transportation facilities; in other words, on railroad connection with the outside world. It was, however, not until 1867 that connection was finally established by rail with the Great Lakes at Milwaukee and Chicago (page 38).

Introduction of harvesting machinery

Another factor of commanding influence in the transformation of the self-sufficing type of agriculture into farming for the market was the invention and improvement of agricultural machinery. Considerable beginnings had, indeed, been made before 1860, as shown by the increase in value of agricultural implements manufactured in the United States from $6,842,611 in 1850 to $17,802,514 in 1860.[9] This striking increase was attributed by contemporary writers largely to the interest in such machinery aroused by the first World's Fair at London in 1851, and the subsequent exhibitions at New York in 1853, and at Paris in 1855.[9] The first reapers, of the Manny type, reached Minnesota about 1855, while threshing machines began to be introduced after 1856.[10] It was, however, after the outbreak of the Civil War, which drained away from the fields so much of their labor force, that the agricultural revolution began in earnest—a revolution not less striking and far-reaching in its effects than the industrial revolution which started in England a century earlier. Between 1860 and 1864 not less than 250,000 American reapers were sold,[11] each capable of doing the work of many men with a great saving both in expense and in time. It is obvious that this revolution in agricultural methods tended to extend the acreage sown to small grains, not only because of their lessened cost of production as compared with other crops, but also because a large area could now be harvested during a few days of favorable weather, when otherwise the crop might have been lost, or seriously damaged by storms.

First culmination of wheat growing

In addition to these favoring circumstances there was a constant influx of new settlers. By 1865, in spite of the Civil War and the great Sioux massacre of 1862, the population of the State had risen from 172,022 to 250,099, an increase of more than 15,000 a year or 45 per cent in five years.[12] This increase of population caused a rapid extension of wheat culture up to 1867 despite the congestion of shipping routes.

A second factor in this extension was the crop yield. In 1860 and again in 1865 the average yield of wheat exceeded 22 bushels to the acre; a figure never since approached (Figs. 71, 102). In 1866 and 1867, on the other hand, the crop was decidedly light and this partial failure was a prime cause of the relative decline which set in for a time after 1867, rendering that year the first culminating point of wheat growing in Minnesota.[13]

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*Uncorrected total carried forward by the Commissioner of Statistics from the previous report, and inconsistent with items there printed over it. For corrected total, see Table 5

[6] *Ibid.*, 91.

[7] *First Annual Report Commissioner of Statistics, 1860*, 101, 109.

[8] Merrick, George B., *Old Times on the Upper Mississippi*, 169.

[9] *Preliminary Report on the VIII Census*, 61, 97, 99); Flint, C. L., *A Hundred Years' Progress*) Report, U. S. Dept. of Agriculture, 1872); Holmes G. K., *Progress of Agriculture in the United States* (Year Book, U. S. Dept. of Agriculture, 1899); Fowler, *Agricultural Machinery* (Depew, *Hundred Years of American Commerce*, II, 352-386.)

[10] Hill, J. J., *History of Agriculture in Minnesota* (*Minn. Hist. Soc. Coll.* VIII, 228-279); Thomas, *Farm Implements* (1854); Emerson, *Rise and Progress of Minnesota Territory*, (1855), 14, 41.

[11] *Census of Agriculture, 1860*, XXII-XXIII.

[12] *Statistics of Minnesota, 1869*, 64.

The course of wheat prices during and after the Civil War

A third factor in the extension and fluctuations of wheat farming was the course of wheat prices. During the Civil War there was a rapid rise owing to the withdrawal of many thousands of men from the fields and the beginning of paper money inflation. The highest price quoted at Chicago ($2.95) for No. 2 contract wheat was in May, 1867; but for some reason, not clearly apparent in the records, the highest point both in Minnesota and Wisconsin was reached in 1866 rather than 1867. It may be that the increase of output and congestion of shipping routes in these two states were responsible for this variation. From this high point the decline was equally rapid up to 1870, though not to as low a level as before the war. After a brief rise in 1872 and 1873 prices again dropped back to approximately the level of 1870. This decline in price of course tended to reduce the acreage in wheat after 1867 (Figs. 51, 52, 53).

The reasons for this abrupt drop in the price of wheat were complex. For one thing, the supply of wheat in the country at large had outrun demand, owing to the rapid extension of cultivation west of the Mississippi; and this condition became still more acute when the disbanded armies returned to the farm and factory. Moreover, the country was entering upon the period of falling (paper) prices, accompanying the decreasing discount on paper money, which continued to oppress all lines of industry until the resumption of specie payments in 1879. Finally, the influence of the panic of 1873 may be seen in the sharp drop during the following years.

Transportation charges

Unfortunately the quotations at Chicago are not fully comparable with those in Minnesota, owing to the irregular character of the Minnesota figures prior to 1876. Nevertheless, the difference between them testifies in a general way to the high cost of transportation.

Freight rates by rail, while low compared to the pre-railroad era, were nevertheless high, measured by the reduced market price of the product. In 1868, for example, the rate on wheat from St. Paul to Milwaukee or Chicago was about 30 cents per bushel[14] and in 1869 the average charge by rail per ton per mile was estimated to be 29.8 mills, against 11.4 on canals, 2.9 on rivers, and 2.5 by sea.[15] In 1871 the newly appointed commissioner of railways reported the average charges as 3.6 cents per ton mile on freight and 4.4 cents per mile for passengers.[16]

Relative decline of wheat

As a result of these several influences, there followed, after 1867, a slight reaction toward a more varied crop system. This movement increased the acreage of oats 30 per cent, corn 29 per cent, barley 53 per cent, and potatoes 39 per cent, in 1868 compared to 1867.[17] The effect was to restore oats to nearly the same relative position which it had held in 1860. In spite of this reaction, however, wheat occupied in 1868, 59.7 per cent of all cultivated land, against 53.4 per cent in 1860 (Fig. 55). Moreover, notwithstanding the severe drought of July, 1868 (Fig. 70), which affected the wheat crop more seriously than any other except oats, wheat amounted to 49.19 per cent of the total bushel crops in 1868,[18] against 36.1 per cent in 1860 and 21.6 per cent in 1859.

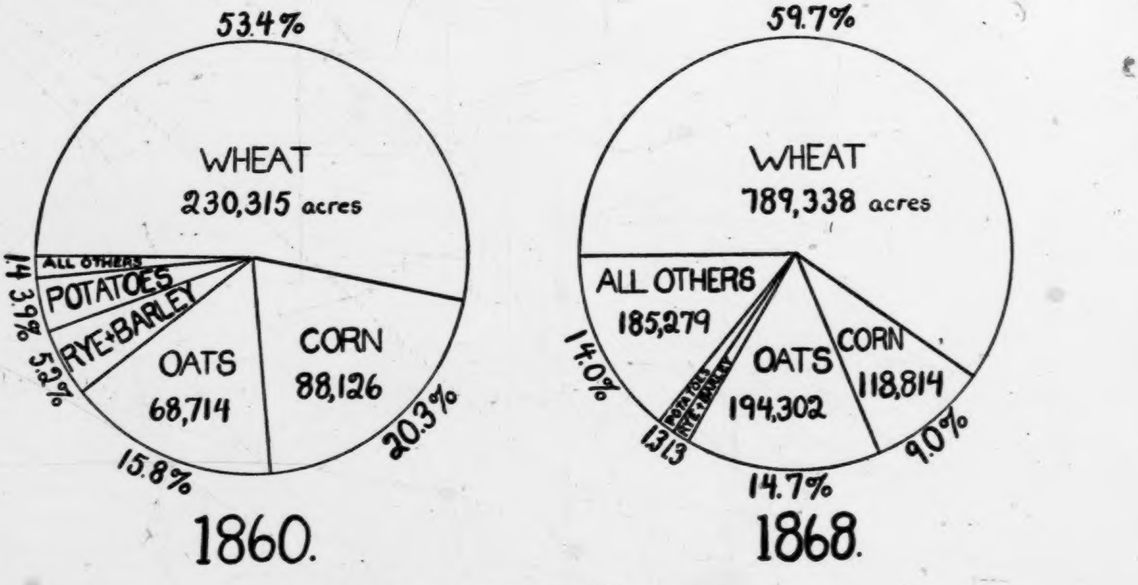

Figure 55. Uses of tilled land in 1860 and 1868.[19]

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[13] *Ibid.*, 7-9.
[14] Message of Governor Marshall, June 7, 1869 (*Minn. Ex. Doc.* 1868-69, 18-19).
[15] Message of Governor Austin, January 7, 1870 (*Minn. Ex. Doc.* 1869-70, 16.)
[16] *Minn. Ex. Doc.* 1871, II, 44.
[17] *Statistics of Minnesota*, 1869, 22, 25, 26, 29, 35.
[18] *Ibid.*, 6.
[19] *Ibid.*, 1861, 54; 1869, 7. For corrections of arbitrary additions, see 1871, 5-15.

Development of stock husbandry, 1860-1869

During the Civil War the great demand for wool coupled with tariff changes caused active speculation in sheep, resulting in an increase from 13,044 in 1860 to 97,241 in 1864 and 193,045 in 1866, when the movement culminated. Thereafter, the number declined to 135,450 according to the state returns for 1869 (Table VI). This rapid decline of sheep farming (Fig. 56) was due not merely to the slackening of demand after the war, but also to the same general decline of prices which affected adversely specialized wheat farming. The number of cattle varied inversely with sheep, declining when sheep increased and increasing when sheep declined.

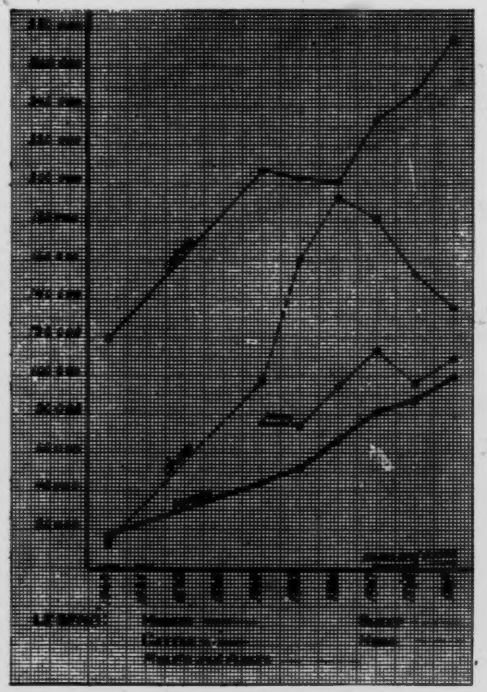

Figure 56. Number of live stock, 1860 and 1864-69.[20]

Population according to the census of 1870

After the close of the Civil War immigration to Minnesota again became very active, rising as high as 40,000 or possibly 50,000 in a single year. During the decade 1860-1870 the population increased from 172,023 to 439,706, a gain of 267,683 or 156 per cent. Compared to the population shown by the State census of 1865 (250,099), the increase during the last half of the decade was 189,607, or 37,921 per year. By no means all of this increase, however, went to the country. There were eleven municipalities in 1870, each having at least 2,500 inhabitants, against three in 1860. With the exception of Duluth, all of them lay south of Stillwater and east of Mankato; and all except Rochester and Faribault were situated on navigable waterways. This southeastern section accessible to the Minnesota, St. Croix, and the Mississippi below the Sauk Rapids, contained more than fourfifths of the population.

The country population, amounting to 327,698 persons, showed a similar localization as appears from the map of the distribution of population outside of incorporated places (Fig. 58). North and west of the Sauk Rapids the principal settlements were in Stearns and Douglas counties; that is to say, in the hardwood belt along the route to the Red River Valley.

Comparing the distribution of population in 1860 (Fig. 40) and 1870 (Fig. 57) with the map of original forest areas (Fig. 8), it appears that the country population, even aside from trappers and lumbermen, persistently clung to the hardwood zone, venturing out upon the open prairies only with reluctance and for the most part after the hardwood region had entirely passed into private ownership. The same thing had happened in Illinois, Wisconsin, and other states on the border between woodland and prairie. The reason was partly ignorance, which led many to argue that the prairie soil must be inferior, since it would not grow trees. Others were deterred by the unfamiliar aspect of the country, especially the lack of windbreaks. In the main, however, the cause for the slow settlement of the prairies was the lack of transportation facilities and of fuel. The prairies lay mostly at a distance from the waterways, which imposed heavy expense for haulage; and in a climate such as that of Minnesota the lack of wood for building and especially for fuel presented a very serious problem.[21] In fact in Minnesota, as twenty years before in Illinois, it was only the coming of the railroad which made the prairies habitable.[22] For this reason, comparatively little progress had been made up to 1870 in settling the prairie section of Minnesota. This was for the most part the work of the years from 1870 to 1900.

Distribution of agriculture according to the census of 1870

The crop season of 1869, represented in the census of 1870, was cold and wet, with unseasonable storms especially at harvest time[23] (Figs. 69, 70). As a result there was a lower yield on heavy clay soils and a higher yield on the lighter soils east of the Mississippi, than the average. The damage at harvest time was greatest in the case of wheat and oats; though oats, being better adapted to a cool and moist climate, nevertheless proved a heavy crop.

The greatest density of wheat growing was in the two tiers of counties west of the Mississippi and south of the Minnesota (Fig. 59); and this in spite of the fact that weather conditions were favorable to sandy soils. The crop was small east of the Mississippi, except in Washington County.

Oats covered substantially the same counties (Fig. 60). There was, however, less concentration in the counties adjacent to navigable waterways, since this crop mostly supplied local consumption.

Barley, another market crop, had its center of production in the same tier of southeastern counties as wheat (Fig. 61); while rye, reduced to insignificance by the spread of wheat growing, was found on somewhat lighter soils, especially north of the Minnesota (Fig. 62). Corn and potatoes, also grown mostly for local use, followed closely the distribution of country population (Figs. 63, 64). The same thing was true of the distribution of hay and dairy cows, though a slight tendency to concentration near the cities may be noted (Figs. 65, 66). All of the products serving local consumption were relatively well represented east of the Mississippi. Measured by aggregate value of farm products, which was reported for the first time in 1870,

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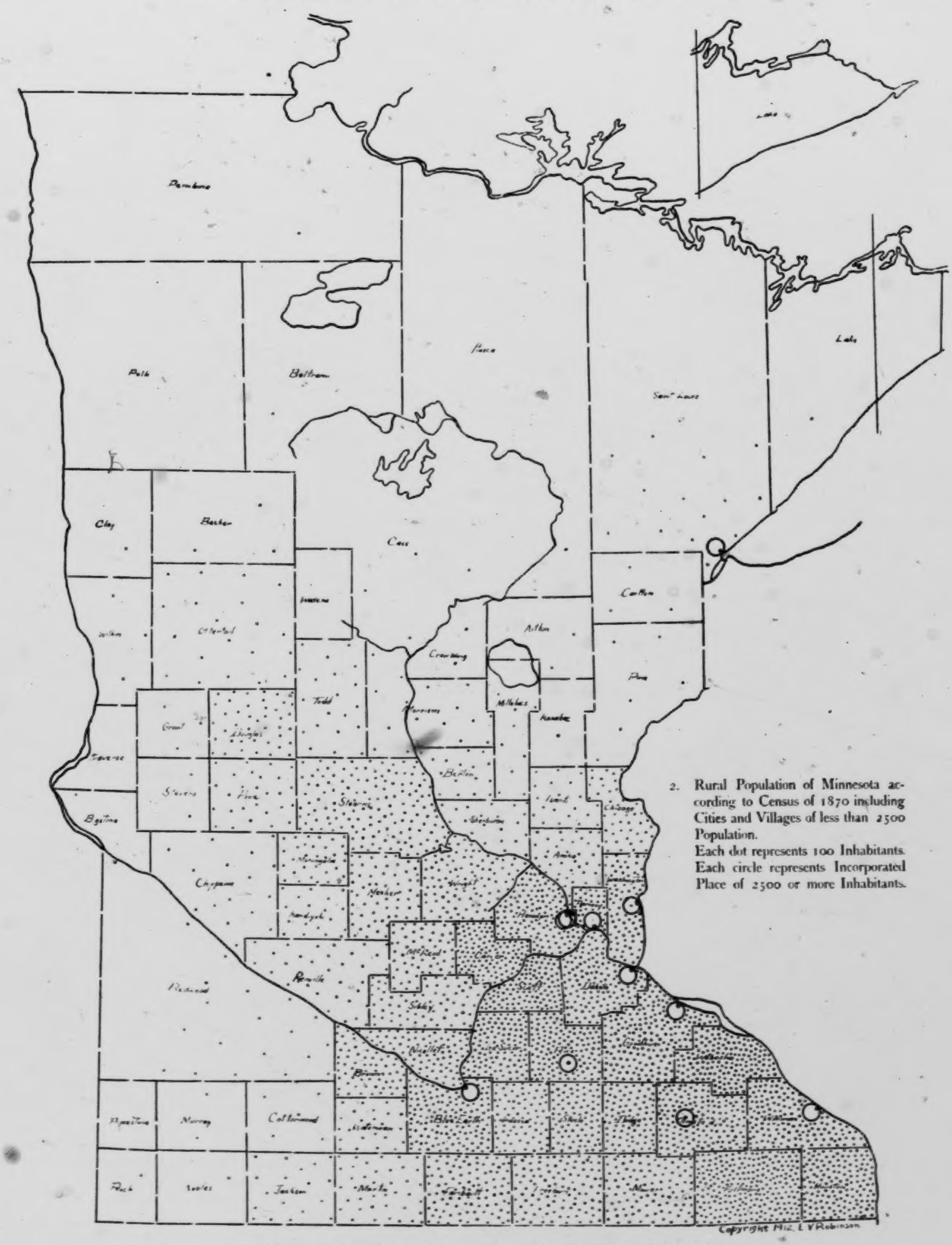
[20] From U. S. Census for 1860; *Minn. Statistics*, 1869, 44, for years 1864-69. Owing to the break between the first and second series of *Statistics of Minnesota*, no figures are available for the years 1861-63 inclusive.

[21] *Statistics of Minnesota*, 1878, 50.

[22] *Illinois Geol. Survey*, Bul. 15.

[23] *Statistics of Minnesota*, 1869, 18-19. McClung, J. W., *Minnesota As It Is in 1870*, 101.



2. Rural Population of Minnesota according to Census of 1870 including Cities and Villages of less than 2500 Population.
Each dot represents 100 Inhabitants.
Each circle represents Incorporated Place of 2500 or more Inhabitants.

Pembina
Polk
Beltram
Itasca
Saint Louis
Lake
Lake
Clay
Becker
Cass
Wadena
Wilkin
Otter Tail
Crow Wing
Aitkin
Carlton
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Stevens
Pope
Stearns
Benton
Isanti
Chisago
Big Stone
Sherburne
Anoka
Chippewa
Meeker
Wright
Kandiyohi
McLeod
Renville
Redwood
Scott
Dakota
Sibley
Nicollet
Brown
Blue Earth
Pipestone
Murray
Cottonwood
Watonwan
Rock
Nobles
Jackson
Martin
Faribault
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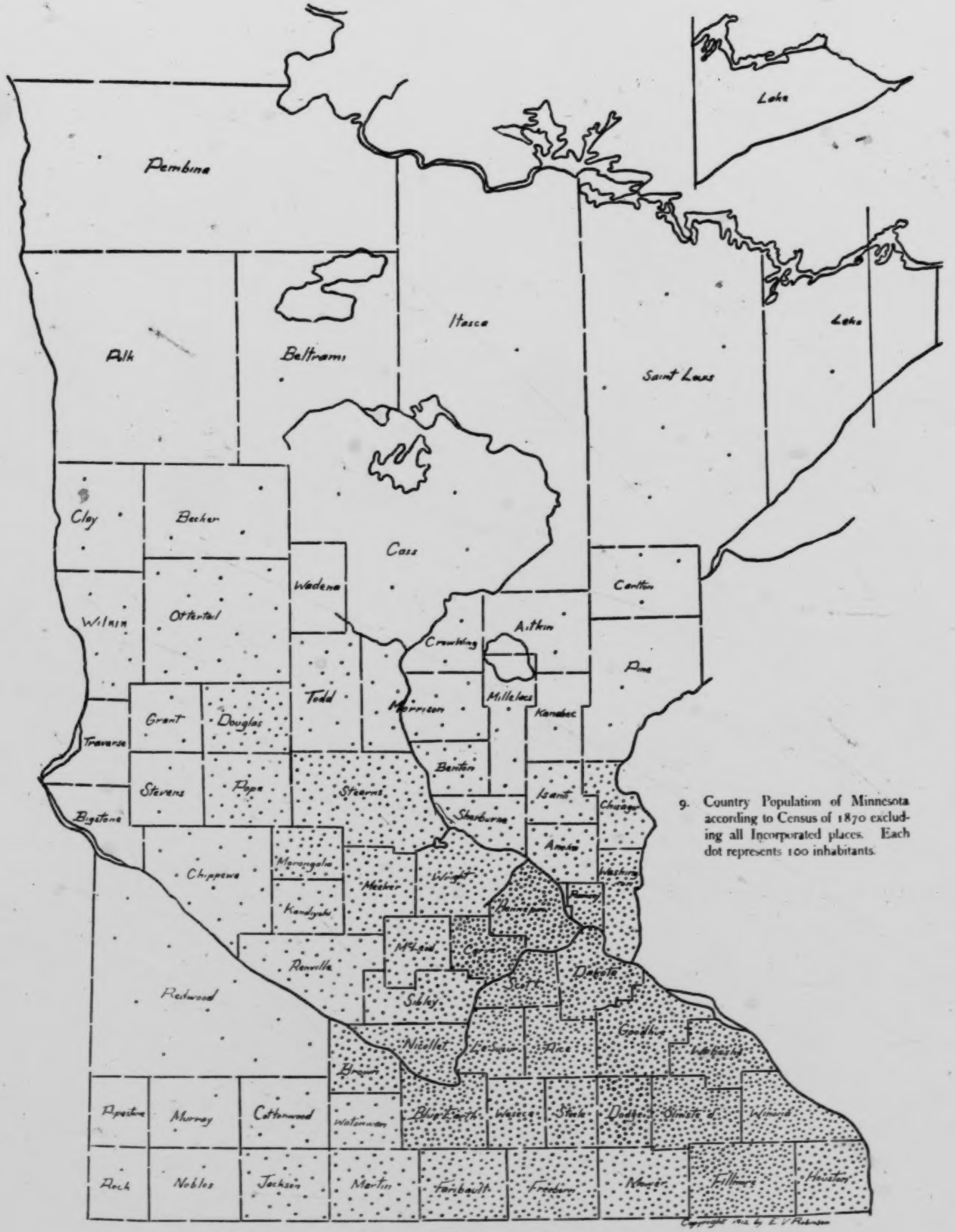
Figure 57. Population of Minnesota in 1870. (Based on Table XI)


Lake
Pembina
Itasca
Lake
Polk
Beltrami
Saint Louis
Clay
Becker
Cass
Wilkin
Ottertail
Wadena
Carlton
Aitkin
Crow Wing
Pine
Todd
Morrison
Mille Lacs
Kanabec
Traverse
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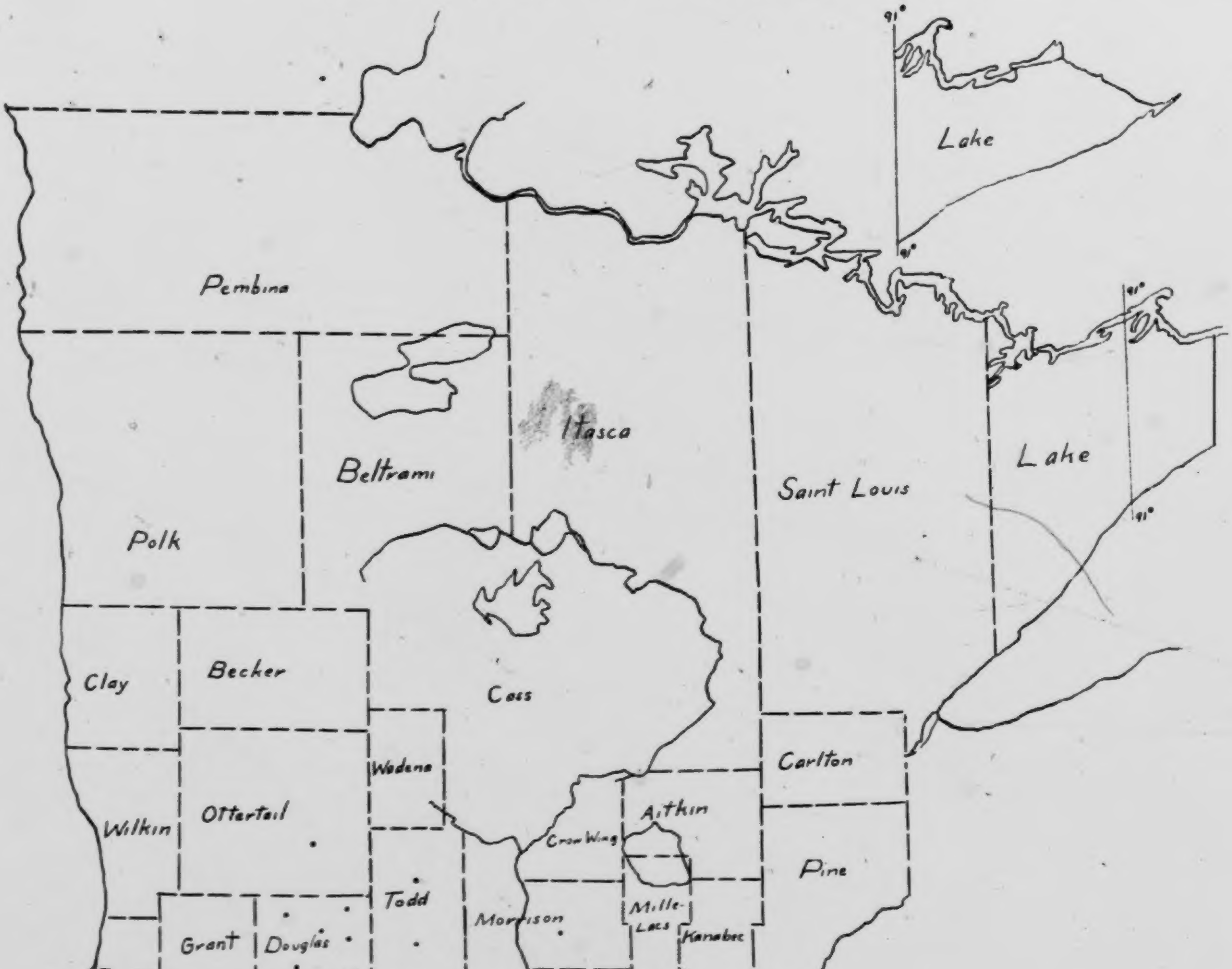
9. Country Population of Minnesota according to Census of 1870 excluding all Incorporated places. Each dot represents 100 inhabitants.

Figure 58. Country population of Minnesota in 1870. (Based on Table XI)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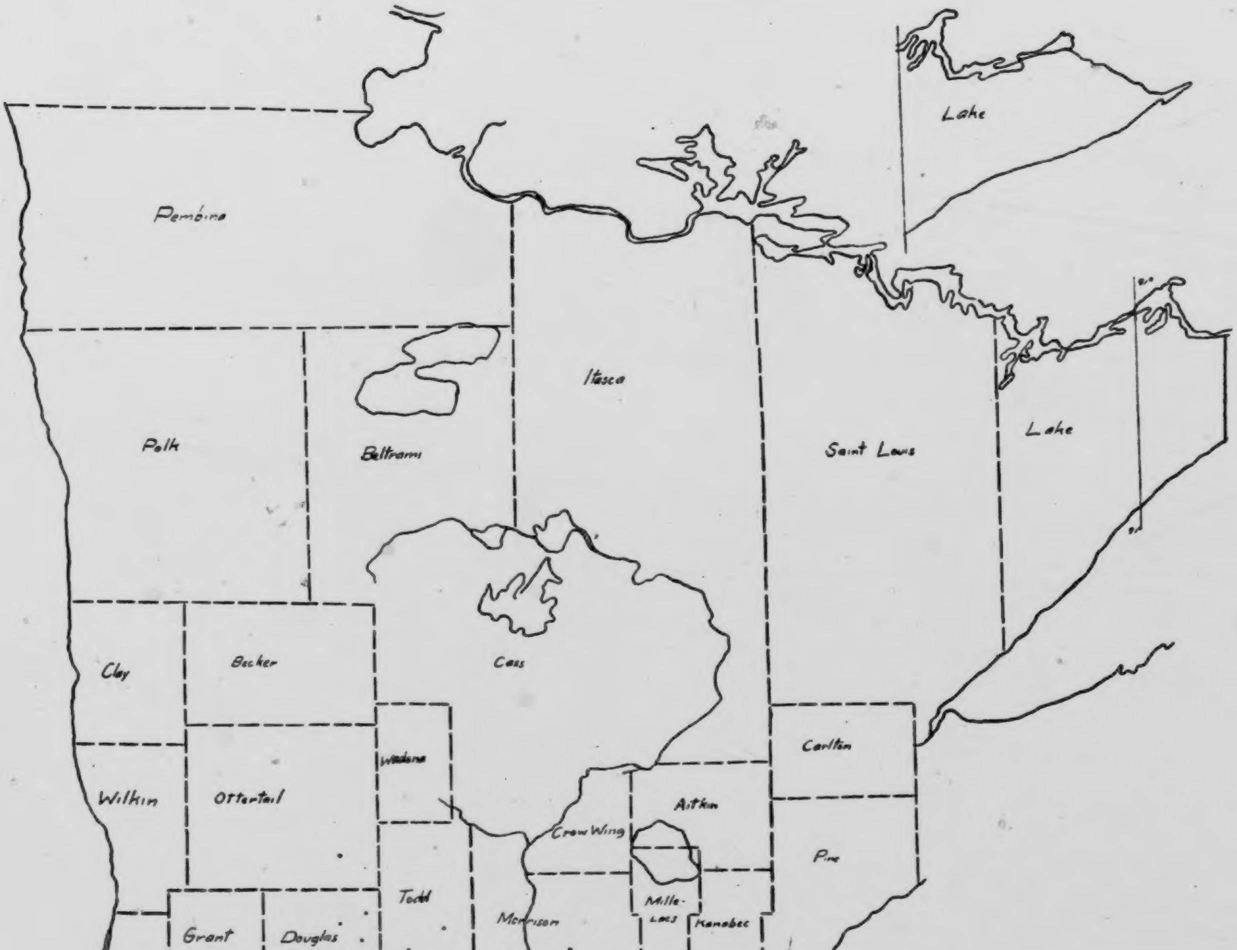
15. Production of Wheat in Minnesota according to Census of 1870. Each dot represents 10,000 Bushels.

Figure 59. Production of wheat in 1869 according to census of 1870. (Based on Table XIII)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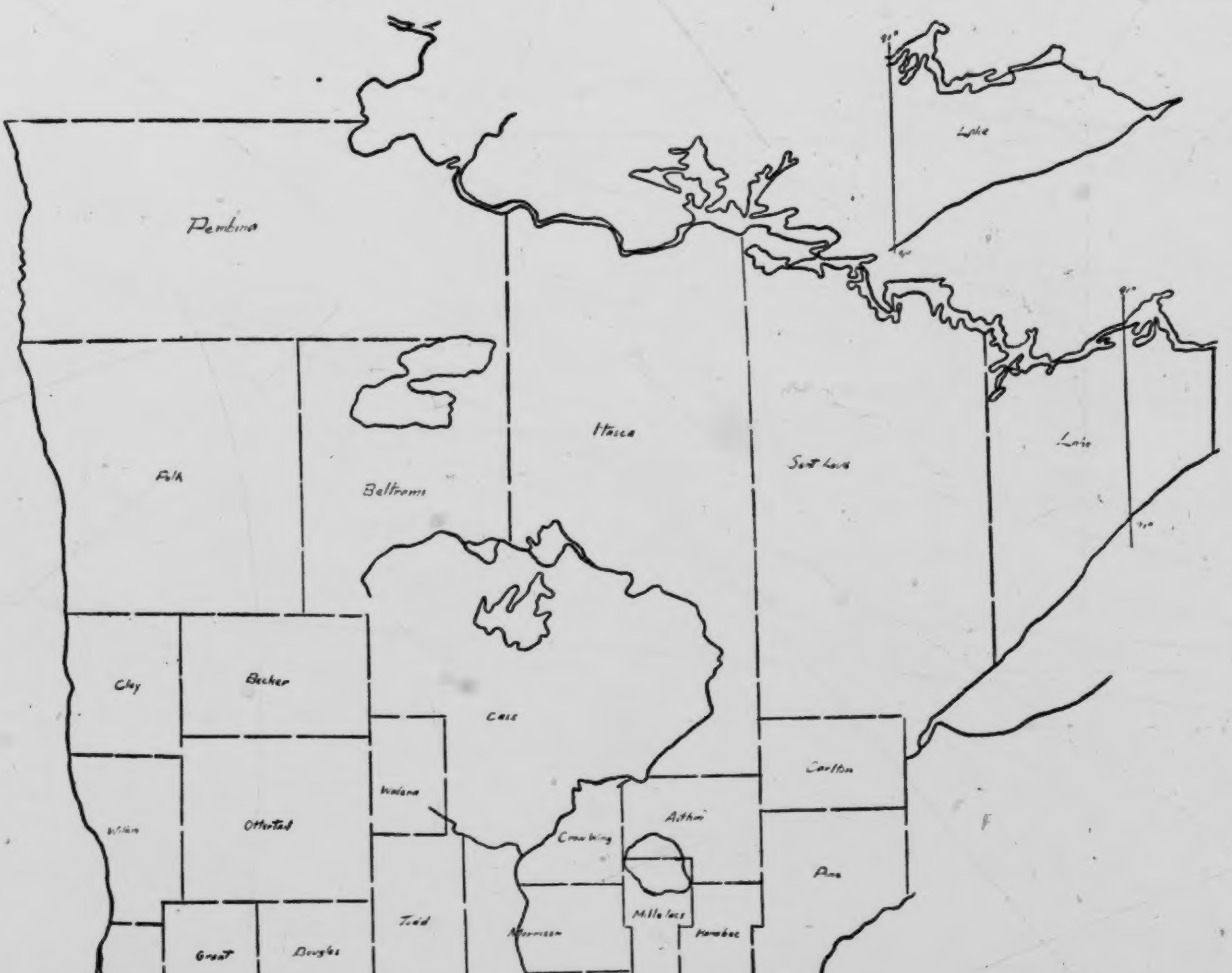
27. Production of Oats in Minnesota according to Census of 1870. Each dot represents 10,000 Bushels.

Figure 60. Production of oats in 1869 according to the census of 1870. (Based on Table XIV)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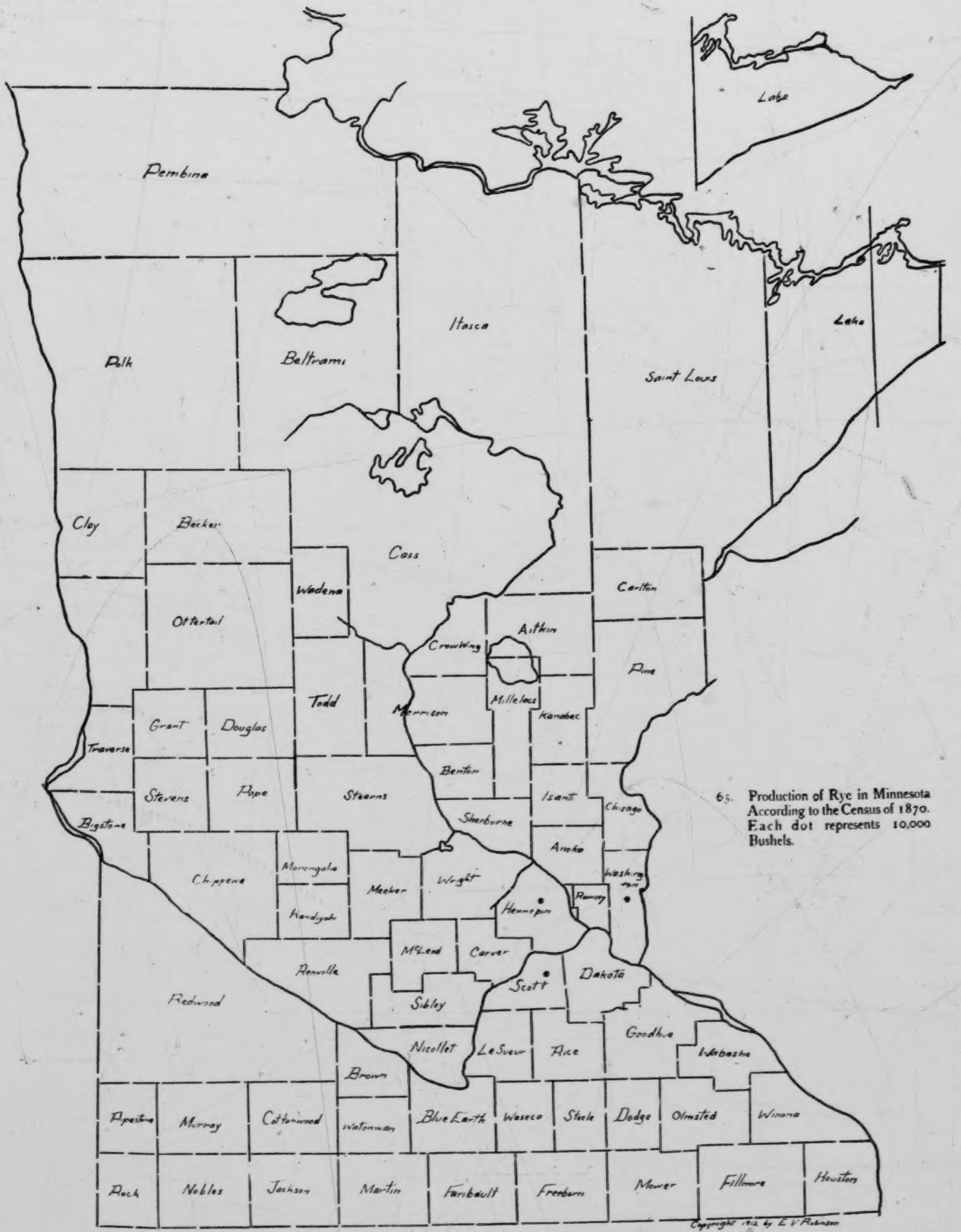
33. Production of Barley in Minnesota according to Census of 1870. Each dot represents 10,000 Bushels.

Figure 61. Production of barley in 1869 according to the census of 1870. (Based on Table XVI)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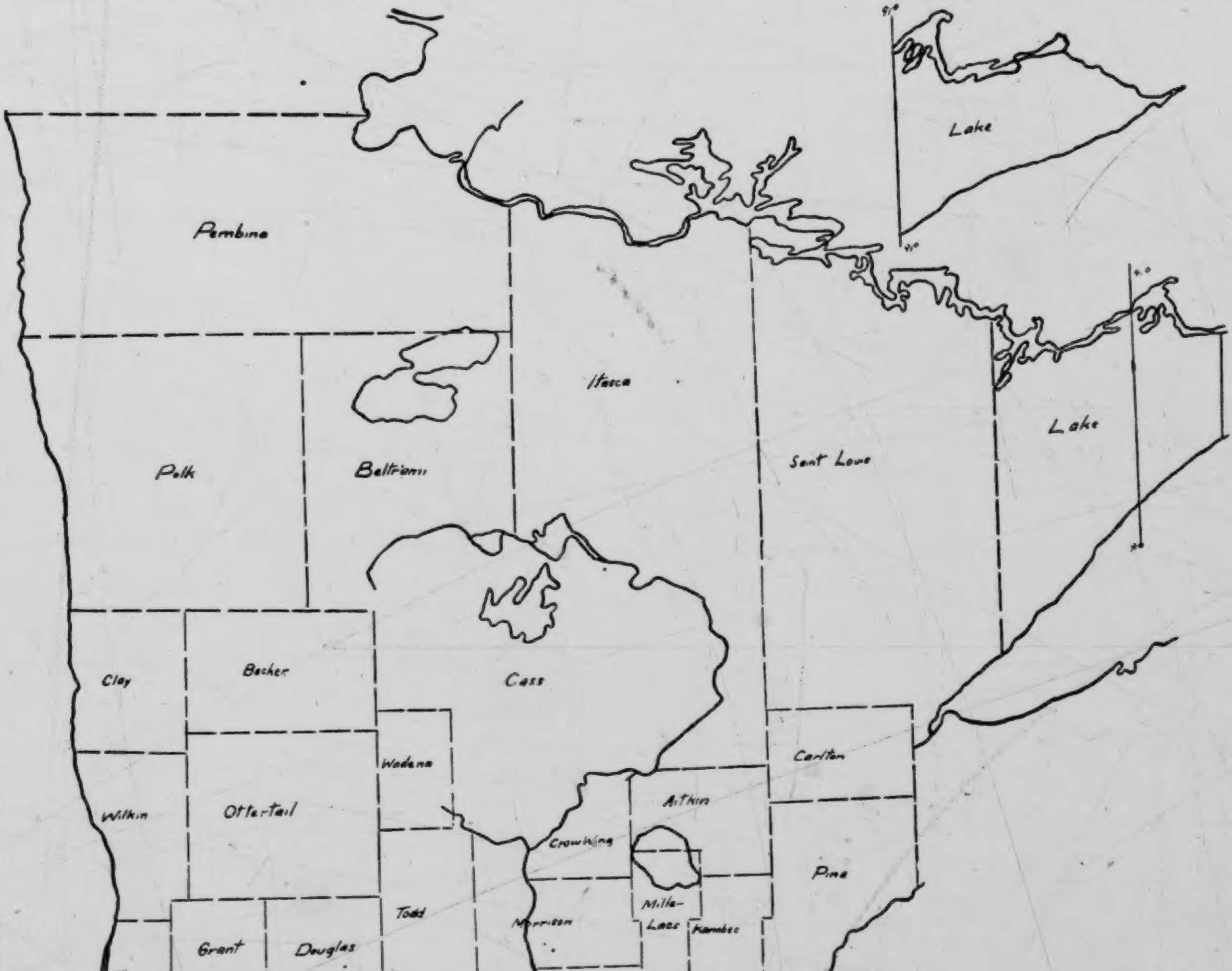
65. Production of Rye in Minnesota According to the Census of 1870. Each dot represents 10,000 Bushels.

Figure 62. Production of rye in 1869 according to the census of 1870. (Based on Table XVII)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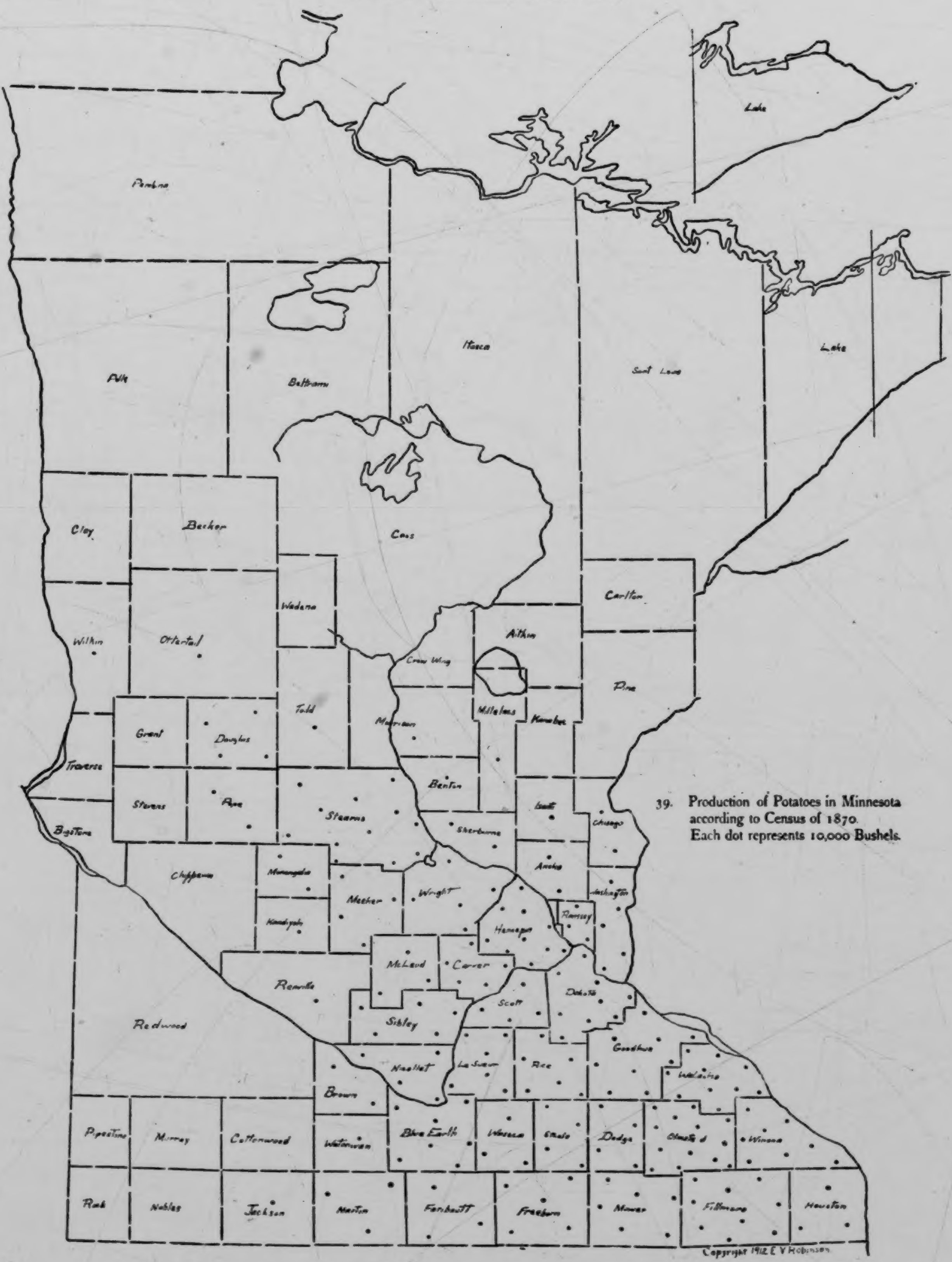
21. Production of Corn in Minnesota according to Census of 1870.
Each dot represents 10,000 Bushels.

Figure 63. Production of corn in 1869 according to the census of 1870. (Based on Table XV)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39. Production of Potatoes in Minnesota according to Census of 1870. Each dot represents 10,000 Bushels.

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Figure 64. Production of potatoes in 1869 according to the census of 1870. (Based on Table XVIII)

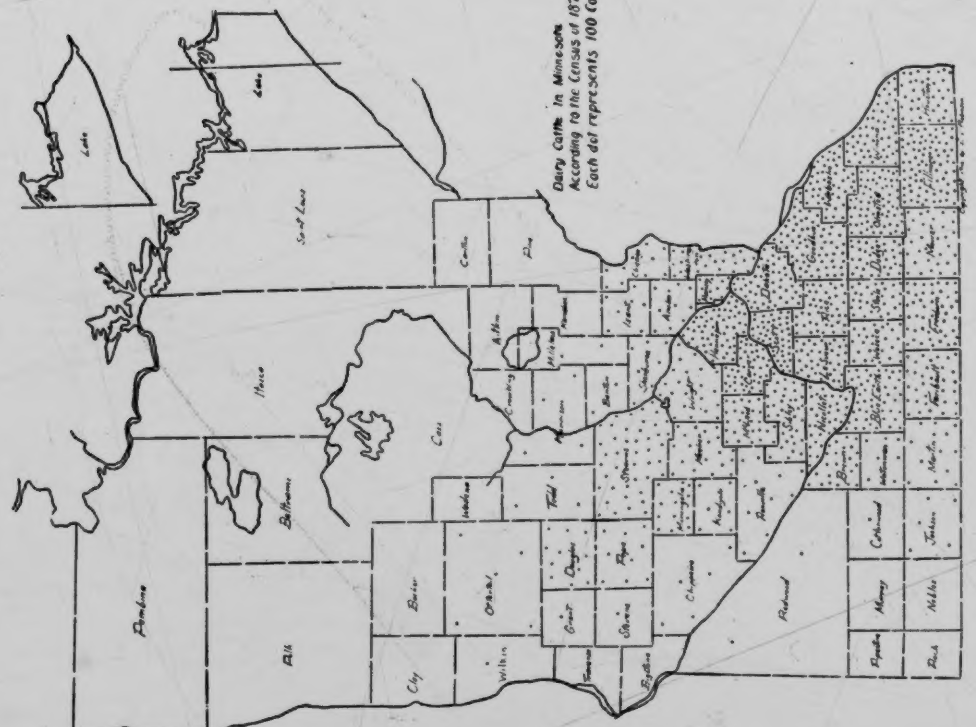

Dairy Cattle In Minnesota
According to the Census of 1870
Each dot represents 100 Cows.

Figure 66. Distribution of dairy cows on farms according to the census of 1870. (Based on Table XXIV)

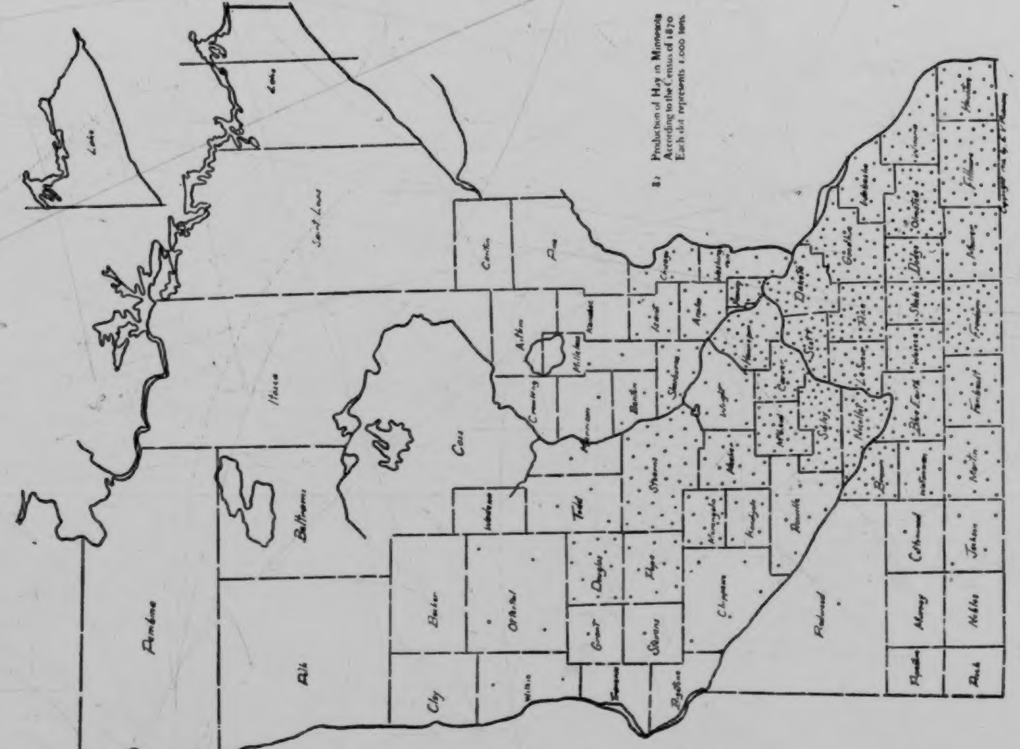
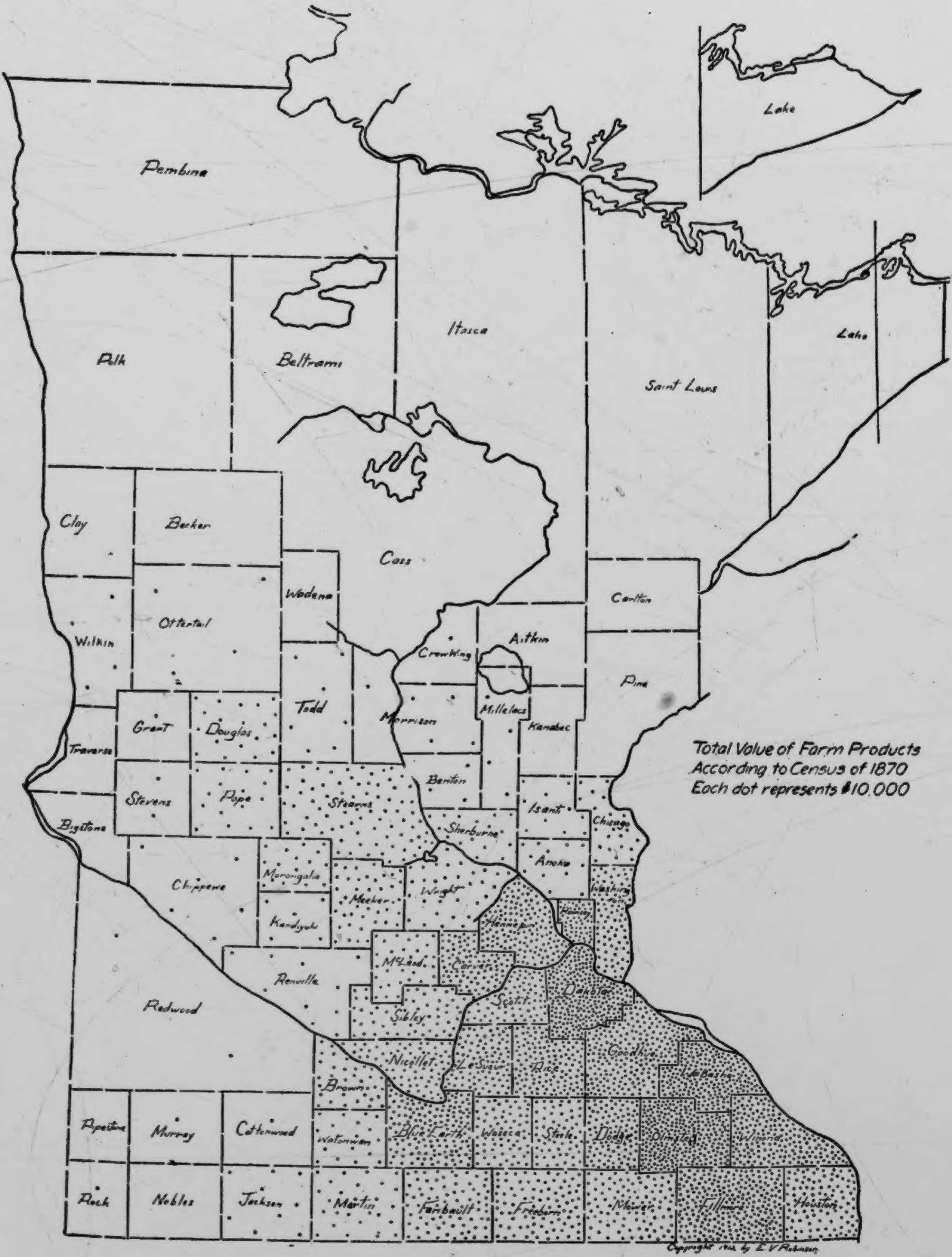

Production of Hay in Minnesota
According to the Census of 1870
Each dot represents 1,000 tons.

Figure 65. Production of hay in 1869, according to the census of 1870. (Based on Table XXII)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Morrison
Millelacs
Kanabec
Grant
Douglas
Traverse
Total Value of Farm Products
According to Census of 1870
Each dot represents $10,000
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Bigstone
Sherburne
Anoka
Chippewa
Monongalia
Washington
Meeker
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Hennepin
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Figure 67. Total value of farm products in 1869 according to the census of 1870. (Based on Table XXXV)

agriculture had developed chiefly south of Anoka and east of Brown County, with a marked concentration along the Mississippi and Minnesota rivers (Fig. 67).

Summary of development, 1860-1870

The development of agriculture during the decade is clearly shown by Table 9 at the end of this chapter, giving the totals from the census of 1860 and that of 1870, with corrections to correspond to the true footings of the county items in the census volumes for 1860.[24] For the sake of a clearer analysis, there are added the percentage of change for each item, the relation which it held to the total country population at each census year, and the differences in values for 1870 if calculated on a gold basis.

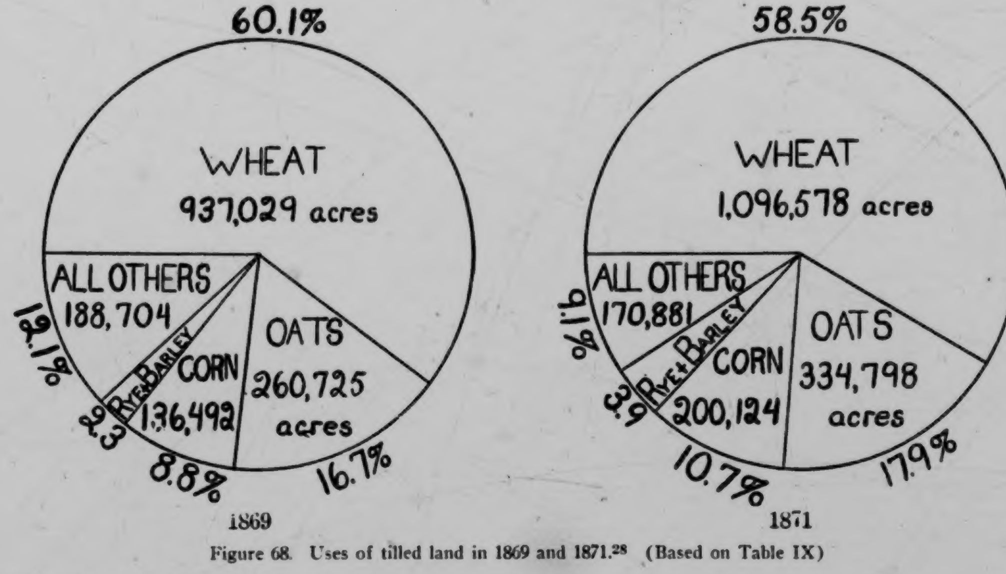
The total population increased during the decade 1860-1870 from 172,023 to 439,706, or 155.7 per cent; while country population grew from 122,530 to 327,698, or 167.4 per cent. Town population, on the other hand, increased only from 49,493 to 112,008. At that time the attraction of free agricultural land was evidently stronger than the lure of the city.

During the same decade the number of farms rose from 17,999 to 46,500 and their average size decreased from 150.7 to 139.4 acres. Moreover, unimproved land in farms increased 93.1 per cent, while improved land increased 317.2 per cent, or more than three times as fast. For each 100 of country population there was consequently less unimproved land in farms in 1870 than 1860, while, on the other hand, there were 708.6 against 4541.0 acres of improved land. It follows, therefore, that, in spite of the movement of population westward, the principal agricultural development of the decade was a more complete use of land, the average improved acreage per farm being 49.9 in 1870, against 30.9 in 1860 (Table 9).

Wheat showed by far the most striking increase, from 2.2 to 18.9 million bushels; or from 17.8 to 57.6 bushels per capita of the country population. Oats, while falling far behind this rate, nevertheless increased from 17.7 to 32.5 bushels per capita of the country population. Barley and flaxseed exceeded even wheat in their ratio of increase but still remained minor crops, closing the decade with 3.1 and .057 bushels respectively per capita of the country population. All other bushel crops lost ground relatively to population and most of them absolutely.

During this period several minor crops attracted considerable attention, without however attaining real importance. During the Civil War, when supplies of southern sugar were cut off, many farmers began to grow sorghum for the manufacture of syrup. Hop culture also spread from Wisconsin into Minnesota, reaching its maximum about 1869, after which there was an abrupt decline.[25] Flax fiber was grown experimentally but remained without serious effect on the crop system. More important was the development of fruit growing. Apple orchards had been extensively planted, especially in the Lake Minnetonka district and on the hillsides along the Mississippi; and in 1869 for the first time these yielded a crop approximating 10,000 bushels.[26]

All kinds of live stock on farms increased more rapidly than country population, except swine and working oxen. Both of these increased absolutely but lost relatively; swine owing to the limited corn crop, working oxen because they were being supplanted by horses and mules. The percentage of increase was greatest in the case of sheep, though the census year did not coincide with the culmination of sheep farming (Fig. 56). Wool increased more than twice as fast as sheep, indicating the introduction of better breeds. The most significant increase, all things considered, was in milch cows, from 40,444 to 121,467; or from 33 to 37.1 for each 100 of the country population. Accompanying this increase in cows was a more rapid gain in butter. Cheese, on the contrary, showed but little change in amount, consequently declining relatively to the country population. This change was in the direction of economic advantage, since the production of good cheese involves more technical skill than the production of butter, and is consequently more difficult upon the farm. In order to overcome this difficulty cheese factories began to be established at the end of the decade, in 1869 and 1870.[27]



1869 1871

Figure 68. Uses of tilled land in 1869 and 1871.[28] (Based on Table IX)

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[24] Corrected total to agree with the county items in the census.

[25] From 283,335 pounds as reported in the state statistics for 1869 (or 222,065 according to the census of 1870), the yield fell to 64,243 in 1871 (*Statistics of Minnesota*, 1872, 25 1873, 189). For 1879 the census reported only 10,928 pounds.

[26] *Statistics of Minnesota*, 1869, 47; 1870, 16; 1873, 205.

[27] *Ibid.*, 1870, 31.

[28] After deducting the arbitrary additions made by the commissioner for 1869. (See *Statistics of Minnesota*, 1870, 15; 1871, 5-13; 1872, 7-10).

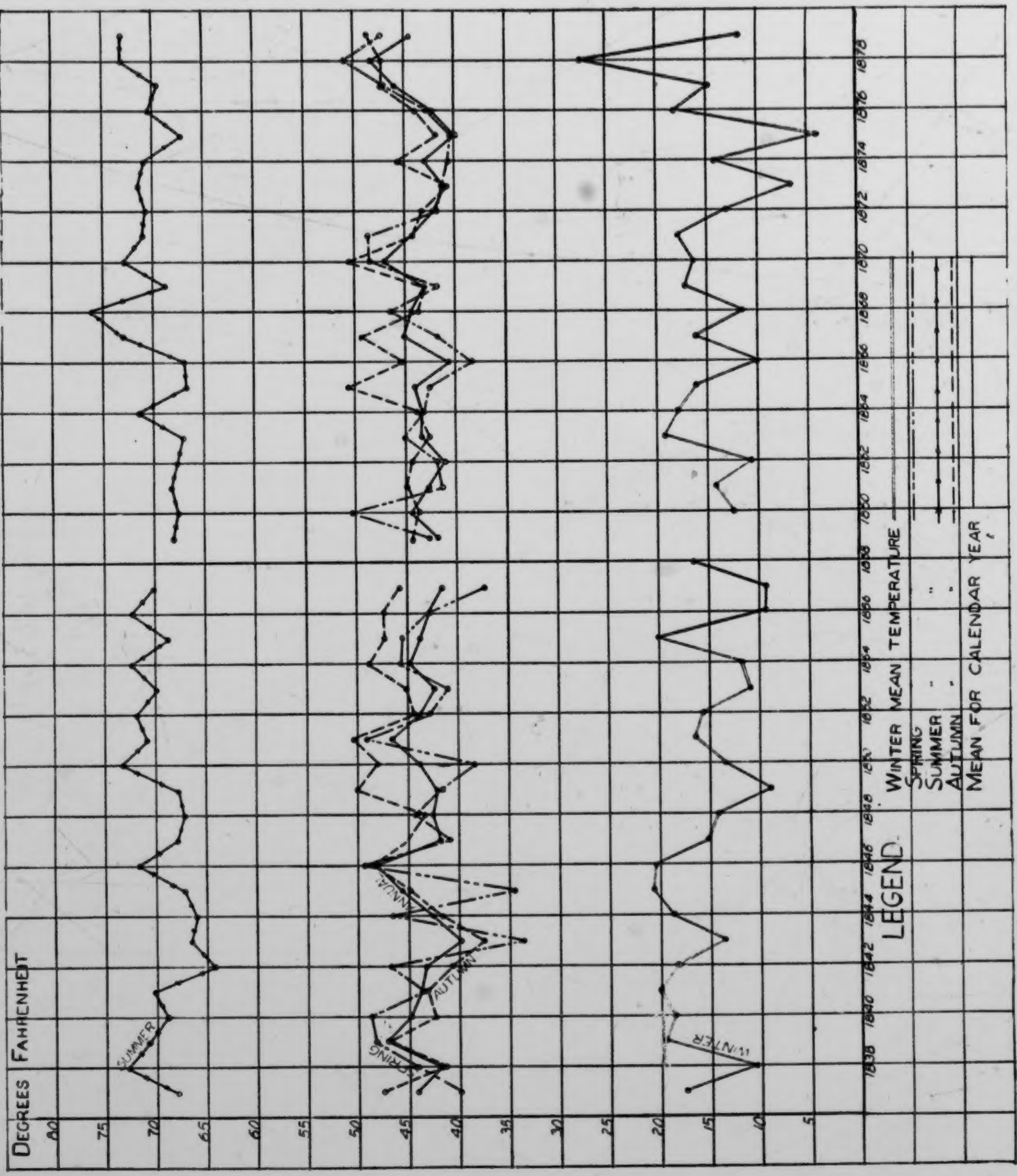

Figure 69. Seasonal and annual temperatures at Fort Snelling, St. Paul and vicinity, 1837-1879.*

* Data furnished by U. S. Weather Bureau at Minneapolis. "Annual" means calendar year; "winter," Dec., Jan., Feb.

First movement toward mixed farming

The value of farms increased more rapidly than the country population or the land in farms, reflecting the greater proportion of improved land as well as the depreciation of the currency (Figs. 208-211); the value of live stock mounted up nearly twice as fast, and the value of implements considerably more than twice as fast, as the value of land. This rapid gain in live stock indicates the beginning of a more varied type of agriculture in some of the older districts; while the increase in implements testifies to the progress of farming by machinery (Table 9, Figs. 204, 209, 210).

If values in 1870 are reduced to a gold basis by discounting currency values 20 per cent, as suggested by the census, the total value of land and buildings for the State still increased more rapidly than during the preceding decade, owing to the large increase of farm land and population. On the other hand, there was a very moderate increase in gold value per capita of the country population, per farm, and per acre in farms; while the decline in value of farms, per acre of improved land, became correspondingly more rapid. This failure of farms to advance in value as fast as they were improved was the first indication of approaching depression in agriculture (Table 9, items 53-55; Figs. 209, 211).

Acreage figures for the several crops were not collected by the federal census before 1880. From the state figures, however, it appears that the total tilled area in 1869, used in growing the crops reported by the census of 1870, was 1,559,073 acres, against 345,000 acres in the crop season of 1859.[29] The distribution of this area between the several crops in 1869 appears from Fig. 68.

Comparing 1869 with 1871, it is seen that wheat gained absolutely but continued to lose relatively, reaching the lowest point since 1863 in the year 1871, presumably as a result of the low wheat prices of 1870 (Fig. 53). Oats, corn, and barley, on the other hand, all made a considerable gain. Potatoes continued to lose in relative acreage as they had done since the appearance of the Colorado potato bug.[30]

Weather conditions, insect attacks, and crop yields, 1859-1879

During the later sixties and early seventies, not only was the price of wheat sagging with the increase of the aggregate supply in the country and with the falling discount on paper money, but the bonanza yields of 1860 and 1865 were not repeated. Contemporary writers generally laid the blame on the weather. In 1868, they said, the weather was too hot; in 1869, it was too cold and wet, especially for wheat; in 1870, again, it was hot and dry; in 1871, it was cold at seeding time but hot and dry in May and June.[31] The seasons of 1872 and 1873 were admitted to be fairly favorable, and 1874 passed without serious complaint; but in 1875 again late frosts damaged the corn, while hot weather in the growing season and heavy rains during harvest injured the wheat; in 1876 hot weather was again responsible for a part of the heavy loss; finally, in 1878, wheat "blighted" extensively in the southern and central parts of the State.[32] It may therefore be worth while to see what the records show on this point. For the period from 1837 to 1879 the seasonal temperature and precipitation at Fort Snelling, St. Paul, and vicinity were as shown in Figs. 69 and 70.

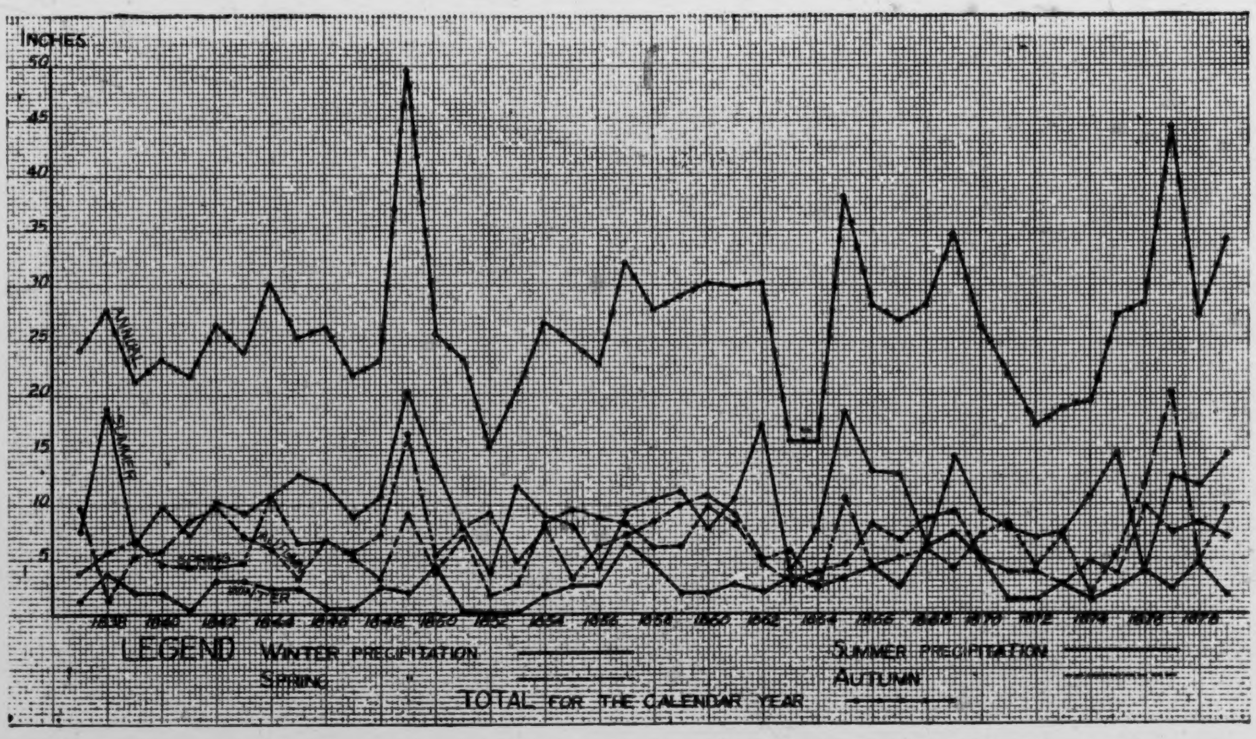

Figure 70. Seasonal and annual precipitation at Fort Snelling, St. Paul and vicinity, 1837-1879.[33]

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[29] After deducting the arbitrary additions made by the commissioner for 1869. (See *Statistics of Minnesota*, 1870, 15; 1871, 10-13; 1872, 7-10).
[30] *Ibid*, 1870, 28-29.
[31] *Ibid*., 1869, 14-15; 1870, 18-19; 1871, 16; 1872, 5-8; 1874, 7; 1876, 17; 1877, 17; 1879, 21.
[32] *Ibid*., 1869, 14-15; 1870, 18-19; 1871, 16; 1872, 5-8; 1874, 7; 1876, 17; 1877, 17; 1879, 21.
[33] Data furnished by U. S. Weather Bureau at Minneapolis. "Annual" means calendar year; "winter," Dec., Jan., Feb.

These diagrams substantiate in a measure the claims of considerable fluctuation in seasonal weather conditions, as may be seen by comparing the lines of precipitation and temperature for the summer season. The severe winters of 1872-73 and 1874-75[34] also left their mark in the records, as shown by the curve of winter temperature.

In addition to unfavorable weather conditions crops were seriously damaged by insects. The Colorado potato beetle began serious ravages in Minnesota about 1868. After settlement reached the prairie districts, particularly from 1863 on, the western counties were invaded by locusts, commonly called grasshoppers. At times the swarms darkened the sky and consumed every particle of green vegetation in their course. The damage from this cause was greatest from 1872 to 1877, the worst year being 1876.[35] Thereafter, their attacks lessened as more effective means of combating them were devised, especially the practice of deep fall-plowing. No sooner was the hopper plague under control than the chinch-bug, which had caused great loss in southern Wisconsin during the Civil War, made its appearance in force in the southeastern corner of Minnesota, destroying two fifths of the crop in Houston County in 1877 and spreading toward the west and north, season by season.[36] As a result of these unfavorable conditions, crop yields became highly irregular and tended on the whole to decline, the lowest yield for most crops being in the season of 1876.

As will be seen from the diagram (Fig. 71), the average yield of wheat fell from 22 bushels in 1860 and 1865 to 17.9 bushels in 1868, 12.28 bushels in 1871 and then, after a series of better yields, to 9.61 bushels in 1876, closing the period with an average yield of 11.3 bushels in 1879.[37] Granting all that was claimed at the time regarding the effect of unseasonable weather and insect attacks, the fact remains that the climate had not materially changed and that methods of cultivation have much to do with the ability of crops to withstand both unfavorable weather and insect attacks. It is therefore impossible, especially in view of the fact that the wheat "blight" of 1868 affected chiefly the older counties,[38] to escape the conclusion that the one-crop system had already begun to exhaust the soil, wherever it had been followed for twenty years or more.

Causes tending to increased specialization in wheat

Indications were consequently not lacking, early in the seventies (Figs. 68, 74), that the craze for wheat had almost run its course, and that conditions were ripe for a return to mixed farming. That this change did not occur at that time, rather than twenty or thirty years later, was due chiefly to three causes.

In the first place, railroads were rapidly bringing fresh lands within reach of the market, and also connecting Minnesota more effectively with the East. It will be recalled (page 38) that in September, 1870, St. Paul secured railroad connection with Duluth, thus opening the Lake Superior route to the East; that in October, 1871, the St. Paul and Pacific reached Breckenridge, in the upper Red River Valley; while the Northern Pacific the same year connected Moorhead at the usual head of navigation on the Red River with Duluth; and that in September, 1872, a new route to Chicago was opened by way of La Crescent and La Crosse. In 1872 also the Minnesota Valley Railroad from St. Paul was extended to Sioux City. The second cause tending to wheat farming was the fact that, owing to lack of capital, most of the farmers even in the older counties were compelled to concentrate their efforts on that crop which promised cash returns in the shortest possible time. These causes were reinforced through the introduction of new and revolutionary methods in flour milling, of which more will be said later.

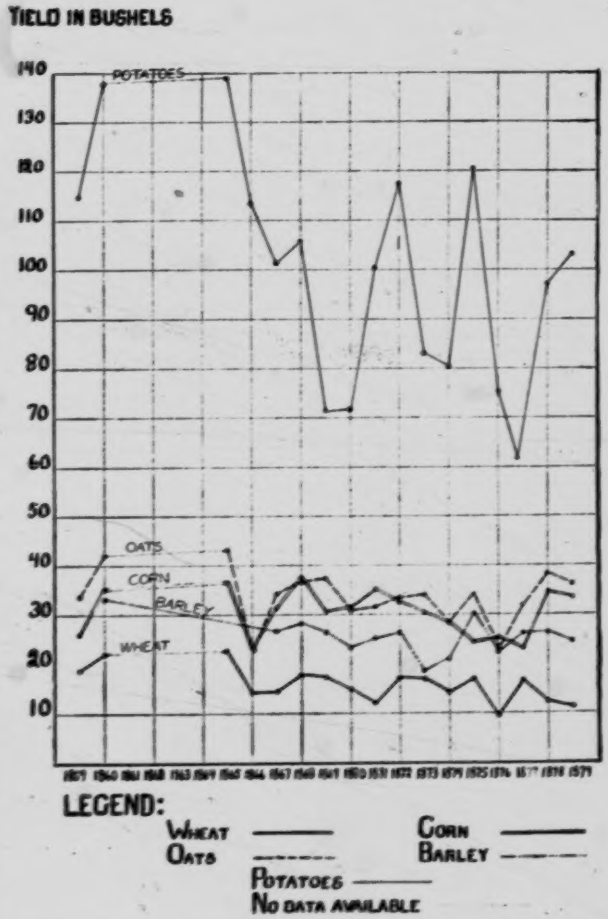

Figure 71. Average acre yields of principal crops, 1859-1879.[37]

To these major causes were added several others of a temporary or incidental character. Thus, it was discovered that cheap prairie land plus automatic agricultural machinery rendered large-scale wheat farming both possible and profitable; and the huge railway grants afforded every facility for assembling great landed estates. As a result, there began as early as 1870[39] the development of that type of bonanza wheat farming which was later to play such a conspicuous part in the Red River Valley. Again, the season of 1872 proved more favorable to wheat in spite of the plague of grasshoppers in the western prairie counties, the average yield being 17.4 bushels per acre against 12.28 bushels in 1871.[40] Further, the destructive epizootic or horse influenza reached the State in December, 1872, and together with the very severe weather during that winter caused severe losses among live stock. The same winter destroyed a large part of the fruit trees which had recently come into bearing,[41] and many more were damaged during the winter of 1874-75. These losses tended to discourage diversified farming.

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[34] *Statistics of Minnesota*, 1874, 21-22; 1876, 17.
[35] *Ibid.*, 1873, 192; 1874, 7-9; 1875, 19-22; 1876, 49, 80, 88; 1877, 17, 19; 1878, 9. *Fifth Report Agricultural Experiment Station*, 96-99.
[36] *Statistics of Minnesota*, 1877, 18, 94; 1880, 22-24, 72-74.
[37] *Ibid.*, 1860, 17; 1880, 21. This average for 1879 is substantially confirmed by the census of 1880, which shows 11.36 bushels of wheat per acre.
[38] *Ibid.*, 1879, 21.
[39] McClung, J. W., *Minnesota As It Is in 1870*, 106-109.

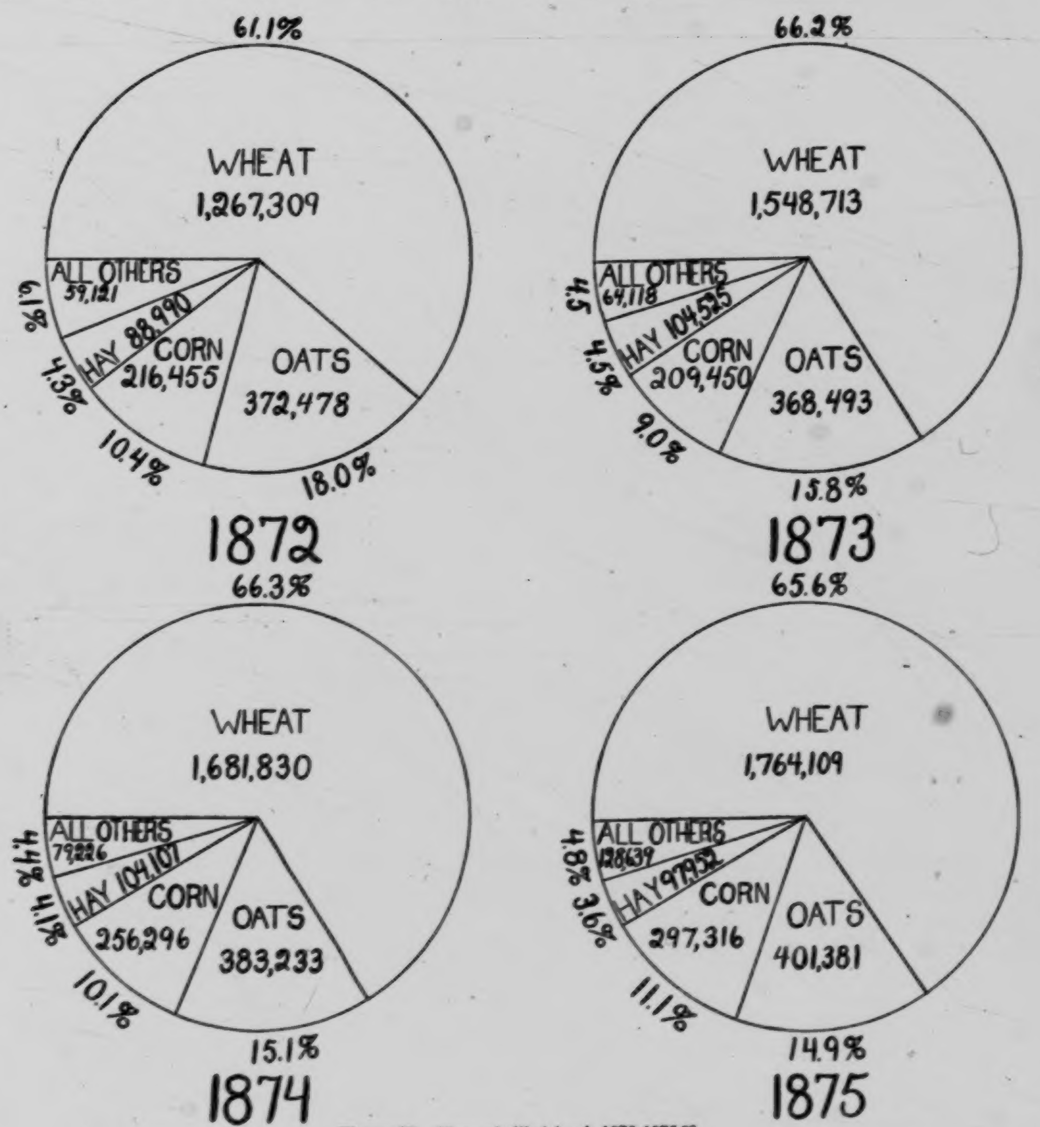

Figure 72. Uses of tilled land, 1872-1875.[28]

Effect of new milling processes

The ancient method of extracting flour from wheat by a single grinding had long been superseded in merchant mills by a process of "high-grinding," which yielded extra flour, bran and an intermediate product called middlings. The middlings when reground yielded an additional amount of flour, but of inferior appearance. It became well-known that the middlings, especially those of spring wheat, contained more nutriment than extra flour of the same weight, and it was a problem among millers how to eliminate the impurities which darken the flour. In 1870, Edmund N. La Croix, a graduate of the École des Arts et Métiers of France, came to Minneapolis and introduced the "middlings-purifier," a combined sifting and suction apparatus, based on a French invention, into the "Washburn B" mill, then operated by George H. Christian. By 1876 this invention was in general use. Meantime, in 1874[42] the plan of using iron or porcelain rollers in place of mill stones, was introduced in the "Washburn A" mill. This plan, originally a Hungarian invention, had been developed and perfected under the direction of Minneapolis millers, and also of John Stevens, of Neenah, Wisconsin, who eventually secured the patents. By 1880 this roller process was also in general use.[43] The essential principle of the new plan was multiple grinding with reduced speed and pressure, the wheat berry being at first merely cracked and the bran removed, and then reduced to flour by successive millings.

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[40] *Statistics of* [illegible]*nesota*, 1873, 192.

[41] *Ibid.*, 243-2[illegible]; 1875, 21-23.

[42] *Minn. His*[illegible]*Soc. Coll.* X, Pt. 1, 45-49; *Statistics of Minnesota*, 1876, 204; Pillsbury, C. A., *American Flour* (Depew, *One Hundred Years of American Commerce*, 1, 260).

The effect was immediate and striking. The middlings purifier alone advanced the price of spring-wheat flour as much as from $1 to $3 a barrel.[42] In place of selling at a discount, it now commanded a premium of at least $1 a barrel over flour made from winter wheat. As a result, spring wheat, owing to its large content of gluten, also rose from 10 to 40 cents a bushel, depending on the grade.[44] This rise in wheat was, however, delayed until competition between the millers forced them to pass on part of the extra profit to the farmers, the final advance averaging perhaps 20 per cent of the previous selling price. Such an advance in price rendered wheat farming a much more profitable business and for the first time established on a solid basis the commercial prosperity of the spring-wheat district of the Northwest.

Second culmination of wheat growing

In view of these favoring conditions wheat growing spread so rapidly after 1871, chiefly in the new counties, as to carry the percentage of tilled land in wheat up to new high levels. The culminating point of this second period was reached in 1874, when wheat occupied 66.3 per cent of all tilled land (Fig. 72).

After 1874 a second reaction set in for several years. The panic of 1873 was far less severe in Minnesota than the one of 1857, yet it brought railroad building practically to a dead stop (Fig. 33), and reacted unfavorably on the market for farm products. As a result, wheat prices again declined, as previously noted, and agricultural discontent became widespread, the immediate ground of complaint being high railroad rates. Already in 1873 it was declared that "wheat is becoming king, and through its alliance with high transportation a tyrant."[45] There was also discouragement due to low yields. After the disastrous crop failure of 1876, for the first time since Minnesota became a State, there was an actual decline in the acreage sown to wheat, chiefly in the south central counties.[46]

The year 1877 thus marked the lowest point of the second decline in wheat growing, but even this low point represented a larger percentage of land in wheat than the first culminating point in 1867 (Fig. 74).

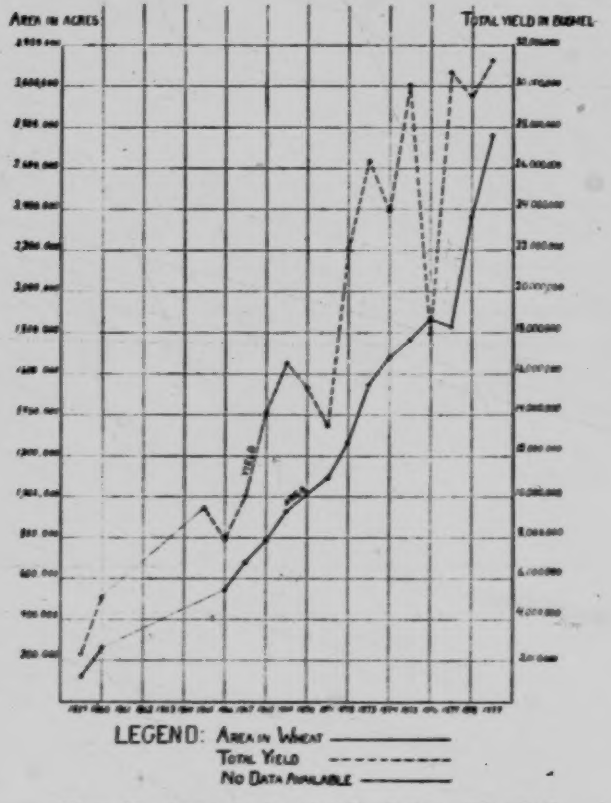

Figure 73. Acreage and total yield of wheat, 1859-1879.[47]

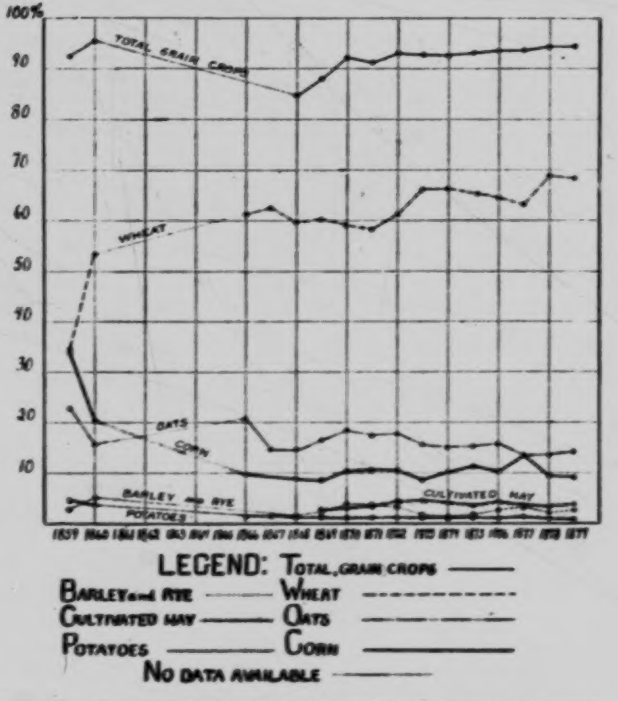

Figure 74. Percentage of tilled land in principal crops in Minnesota, 1859-1879.[48]

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[43] *Wis. Hist. Coll.*, 1907, 246 ff.
[44] *Statistics of Minnesota*, 1877, 27.
[45] *Ibid.*, 1873, 188.
[46] *Ibid.*, 1878, 14.
[47] *Ibid.*, 1861, 56; 1878, 15; 1880, 23. Figures for 1868 and 1869 corrected by elimination of arbitrary addition. (See 1871, 6 ff.)

In spite of the check to railroad building after 1873, the population of the State rose from 439,706 at the federal census of 1870 to 597,279 according to the state census of 1875, the increase being 157,573 or at the rate of 36 per cent for the five years. A considerable part of this increase was in the southwestern counties, below the Minnesota River, adjacent to the line of the Minnesota Valley Railroad. During the same period tilled land increased 74 per cent and the yield of wheat 78 per cent.[49]

First indications of diversified agriculture

While wheat farming was thus rapidly spreading, especially toward the west and northwest, there were evidences in the older section of a beginning of diversification. For example, the statistics collected by the State Grange for 1873, covering mostly well-established farms in the older counties, showed a materially lower percentage of land in wheat and grain crops generally than obtained in the State at large. On the other hand, flax was well represented, especially in Blue Earth County, adjacent to the linseed oil mill at Mankato; cultivated hay occupied 8.57 per cent of tilled land on the grange farms, against 4.39 per cent in the State as a whole; while minor crops held 2.38 per cent, against 0.76 per cent shown by the state statistics.[50] Included under minor crops were sorghum, hops, tobacco, peas and beans (in which a colony of English settlers in Martin County was specializing),[51] clover and grass seed, broom corn, and small fruits, especially raspberries, currants, and strawberries. Orchard fruits, however, including chiefly apples, suffered greatly from the severe winter of 1872-73 and again from the winter of 1874-75,[52] which made it clear that Minnesota was not likely soon to rival Michigan or Ohio as a fruit-growing state.

Another evidence of increasing diversification is the fact that in 1874 ten of the older counties (Dakota, Fillmore, Goodhue, Hennepin, Houston, Olmsted, Rice, Wabasha, Washington, and Winona), each containing 5,000 or more acres of cultivated hay, together comprised nearly 80 per cent of the cultivated hay in the State, while four of them (Fillmore, Olmsted, Winona, and Goodhue) alone had 32.82 per cent of the entire crop.[53] The same ten counties in 1874 had 35 per cent of the milch cows, producing 37 per cent of the butter, and sheared 34 per cent of the sheep in the State. In brief, as early as 1873, different types of agriculture began to prevail in the older and the newer parts of the State. This difference, which still continues, in a measure prevents state averages from being truly representative of any large section of Minnesota.

Third and final culmination of wheat growing

The crop failure of 1876 caused high prices for wheat in 1877 (Fig. 75). As a result so much land was planted to wheat the next spring as to make 1878 the third and final culminating point of wheat culture in Minnesota, this one crop then occupying 68.98 per cent of all tilled land. No other year has equaled that record. There was a poor crop in 1878, and the yield per acre was still lower in 1879, exceeding but little the aggregate crop of 1878 or even 1875, in spite of the larger acreage (Fig. 73). Prices also failed to maintain the level of 1877.[54] The percentage of land in wheat consequently fell off slightly in 1879, due to an actual loss of acreage in the south which partially offset the gain in the north and west.[55]

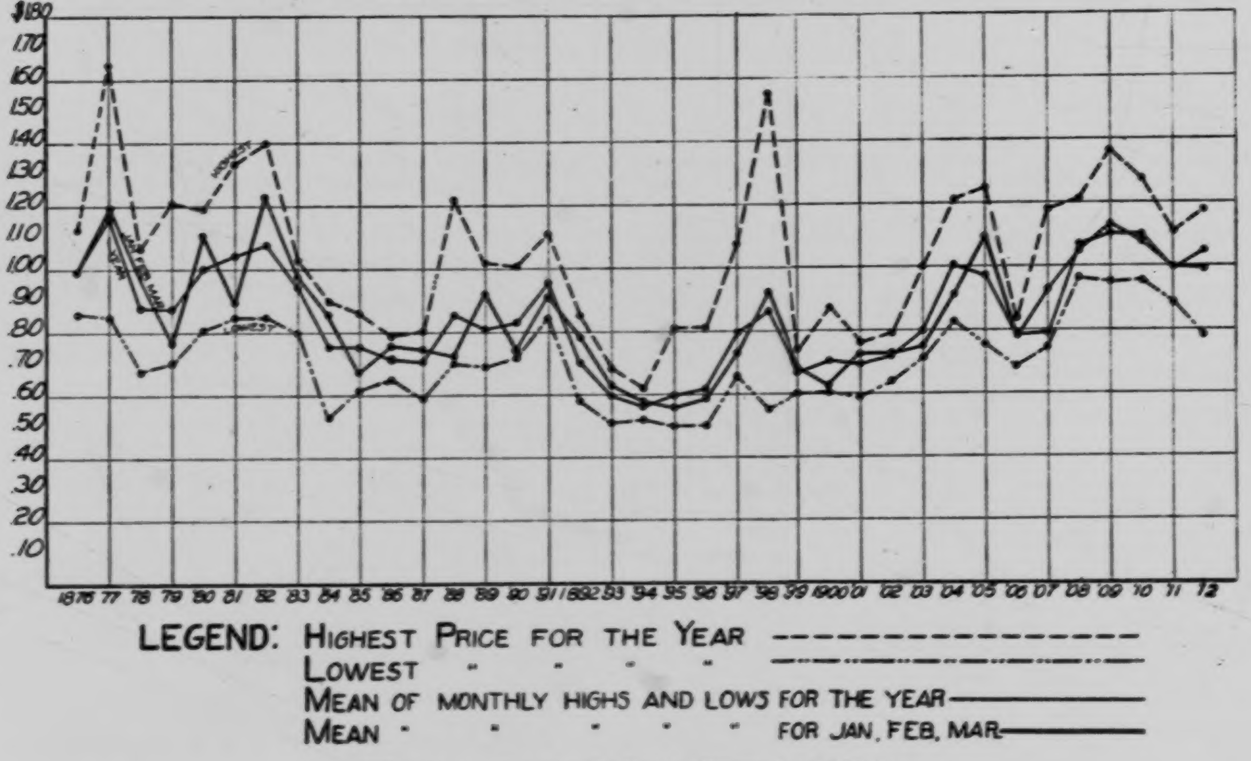

Figure 75. Average price of wheat in Minneapolis, 1876-1912.[54]

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[48] *Ibid.*, 1861, 54-62; 1867, 7; 1872, 8; 1877, 27; 1880, 21. Figures for 1868 and 1869 corrected according to 1871, 6 ff.

[49] *Ibid.*, 1875, 13. The summary on page 110 of the same report gives the total population as 597,407.

[50] *Ibid.*, 1873, 255-257; 1875, 33-34.

[51] *Ibid.*, 1874, 17.

[52] *Ibid.*, 21-22.

[53] *Ibid.*, 1875, 33-34, 49.

[54] *Thirteenth Report of Minneapolis Chamber of Commerce*, 82-88, using highest and lowest closing prices.

[55] *Statistics of Minnesota*, 1880, 22.

Diversification in the later seventies

Among the minor crops flaxseed made a great gain in 1879, occupying about six times as much land as previously.[56] This increase was largely in the southwest, where flax was used as a sod crop in lieu of beans, which had previously been so employed.

After the great blizzard of January, 1873, which caused much damage and suffering in all the prairie states, Congress passed the Timber Culture Act, designed to encourage the planting of windbreaks. In 1876 this was followed, in Minnesota, by the organization of the Minnesota State Forestry Association and by the grant of state money for the encouragement of tree planting.[57] These tree bounties, which were largely increased a dozen years later, have cost the State to date more than $600,000, and it may be doubted whether they have accomplished anything which would not have come to pass sooner or later without them.[58] Nevertheless, the association and the bounties did turn public attention to the desirability of tree planting, and within a few years the open prairies were dotted with small groves. This increase of shelter was one of several circumstances favorable to the development of animal industries.

For some years prior to 1876 there had been a number of farms in the State devoted to raising blooded stock for breeding purposes. All kinds of live stock as well as poultry were represented on these farms, though it was claimed by some that the common cattle throughout the State were of low grade and still deteriorating.[59]

The decline of sheep farming, which had been in progress from 1866 on, was checked after 1871.[60] After that date the number of sheep again increased, especially in the Coteau des Prairies region of the southwest, and by 1879 was greater than in 1866; though of course sheep were relatively less important at the later date because of the great increase of country population.

More significant than increase of number was the increase of wool (Fig. 76). In 1868 the clip averaged less than 3 pounds per head; by 1872 it had reached 4 pounds; and in 1879, it exceeded 4.5 pounds per head. This change evidently signified the introduction of better stock. One cause promoting sheep farming was the existence of a woolen mill at Minneapolis, which furnished a market for practically all the local wool and even a considerable amount from Colorado.[61] On the other hand, the principal factor limiting the industry was the loss caused by dogs and wolves.[62] In Minnesota, as in most of the states east of the Mississippi where farms are relatively small, sheep are not kept in sufficient numbers to warrant the regular employment of guards as in the Rocky Mountain region.

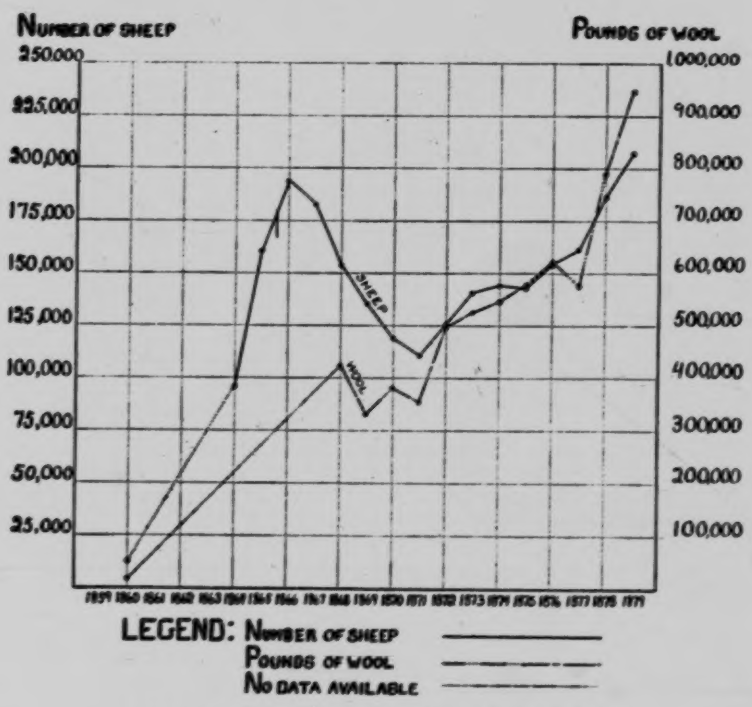

Figure 76. Increase of sheep and wool, 1859-1879.[60]

Development of dairying

The dairy industry, being less speculative than sheep farming, showed both a steadier, and in the long run a more rapid, development, as will appear from Fig. 77. In this diagram the barbed curves represent federal statistics, while the others are based on the annual state returns. These state returns run materially lower than the federal because they were collected by the assessors, which furnished a motive for understatement in the case of live stock subject to taxation. Both sets of curves show an increased rate of growth in the dairy industry about 1868 or 1869, when the first serious reaction set in against specialized wheat growing.

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[56] *Ibid.*, 1880, 32.
[57] *Ibid.*, 1876, 157-158; Laws of 1876, chap. cx.
[58] *Report of State Forester*, 1911, 107.
[59] *Statistics of Minnesota*, 1876, 116-151.
[60] *Ibid.*, 1860, 100; 1861, 74-75; 1869, 44; 1870, 31; 1872, 26; 1880, 39.
[61] *Ibid.*, 1878, 224.
[62] *Ibid.*, 1876, 137-142.

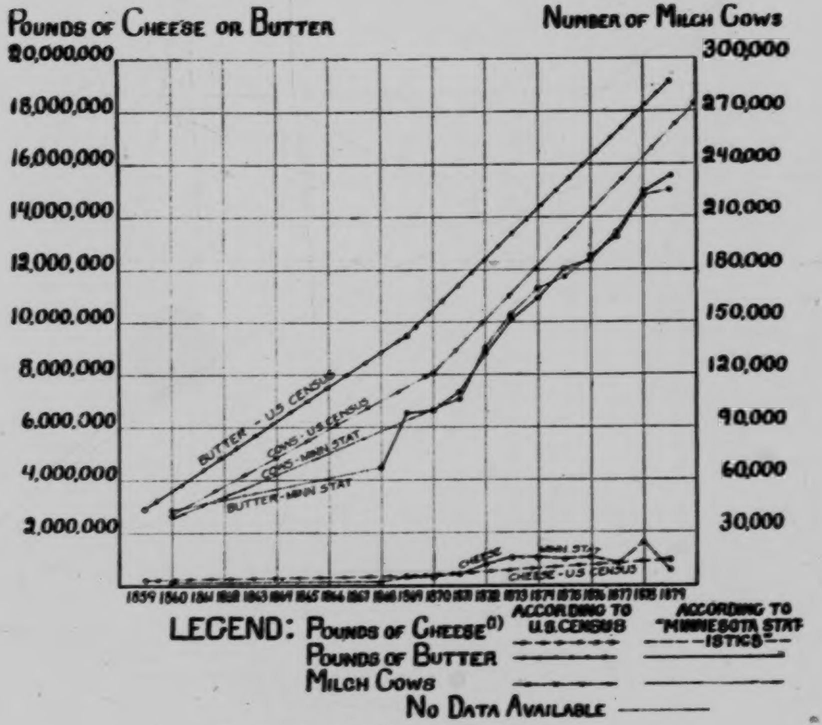

Figure 77. The dairy industry, 1859-1879.[63]
(See Tables XXIV and XXXII)

Butter and cheese as farm products date from the beginning of agriculture in Minnesota, though the first record of cheese marketed in St. Paul is for the year 1852.[64] Both butter- and cheese-making in the United States were then entering the transition from farm to factory industries. New York State took the lead in this change, the first cheese factory there dating from 1851, and the first butter factory from 1861.[65] In Minnesota, as already noted (p. 73), the first cheese factory had been established about 1868 or 1869, the census of 1870 reporting two such factories.

They multiplied rapidly thereafter, the Minnesota statistics for 1876 showing 49 cheese factories in the State.[66] At that time it was declared that, while Minnesota butter had no particular reputation, Minnesota cheese, already in large part a factory product, ranked with the best.[67]

Butter factories were established later and less rapidly. In January, 1876, the Langdon Butter and Cheese Factory Company was orgnaized in the Cottage Grove district as a joint stock company, producing during the first season 52,000 pounds of cheese and 300 pounds of butter.[68] It was then calculated that it took 9½ pounds of milk to make a pound of cheese, but 22¼ to make a pound of butter (a ratio of 1 to 2.34);[69] hence it would not pay to produce cheese, supposing other expenses to be equal, unless cheese sold for at least 42.7 per cent as much per pound as butter. At the State Fair in October, 1876, it is recorded that "the display of butter and cheese was very fine, a number of factories having samples that would convince the butter- and cheese-makers of Ohio and New York that it is time for them to look to their laurels."[70] It seems, however, that butter factories were relatively few, since the next year (1877) we find the *Pioneer Press* publishing an article on butter factories as a new institution which readers were invited carefully to consider.[71] In February, 1878, the State Dairymen's Association was organized and dairying was advocated as "more certainly remunerative than wheat growing because it is not so liable to injury by grasshopper depredations, unpropitious seasons, hail storms, etc., nor does it occasion depletion of the productive elements of the soil."[72] In

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[63] Data from U. S. Census, and *Statistics of Minnesota*, 1861, 68-69; 1870, 16; 1871, 23; 1872, 27; 1880, 38. "Cheese" includes both farm and factory product.
[64] *Minnesota Pioneer*, July 29, 1852.
[65] *Year Book*, U. S. Dept. of Agriculture, 1899, 385-386.
[66] *Ibid.*, 1876, 85. The industry was, however, still unstable, as the next year only 46 factories were reported and a number of these were in other counties (*Ibid.*, 1877, 100).
[67] *Ibid.*, 1877, 55; also Table 10, items 63, 64.
[68] *Ibid.*, 1876, 151.
[69] *Ibid.*, 117.
[70] *Ibid.*, 1877, 55-56.
[71] *Report of State Agricultural Society* 1906, 57.
[72] *Statistics of Minnesota*, 1878, 39

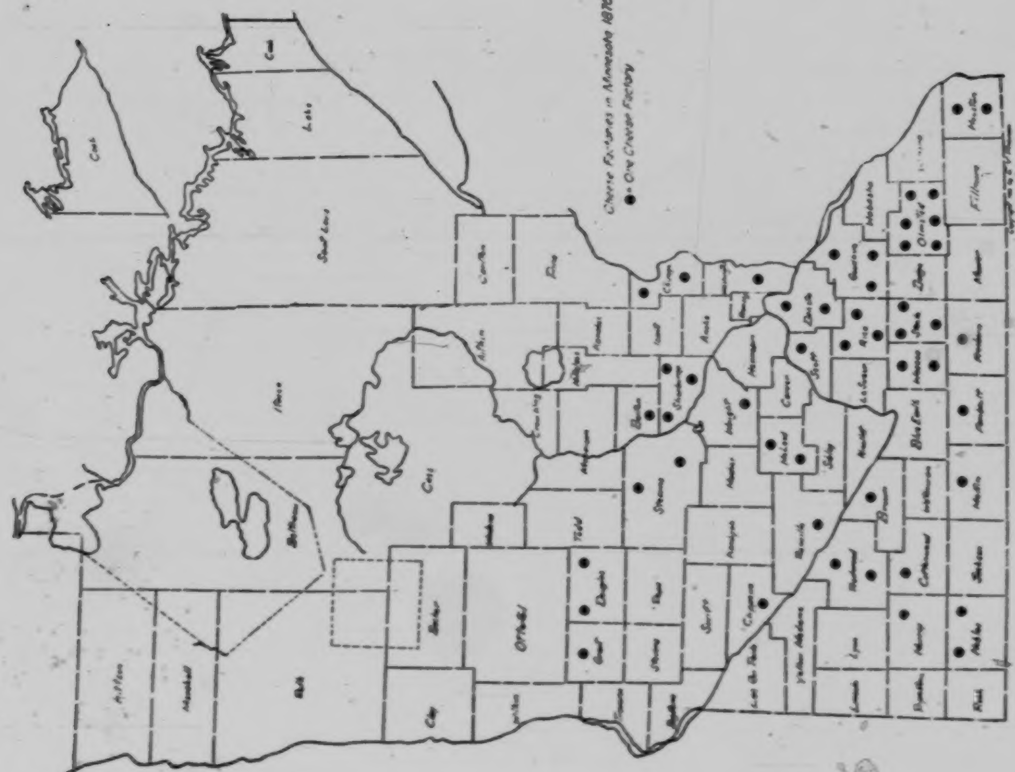
Cheese Factories in Minnesota 1876.
● = One Cheese Factory

Figure 78. Distribution of cheese factories by counties in 1876.[68]

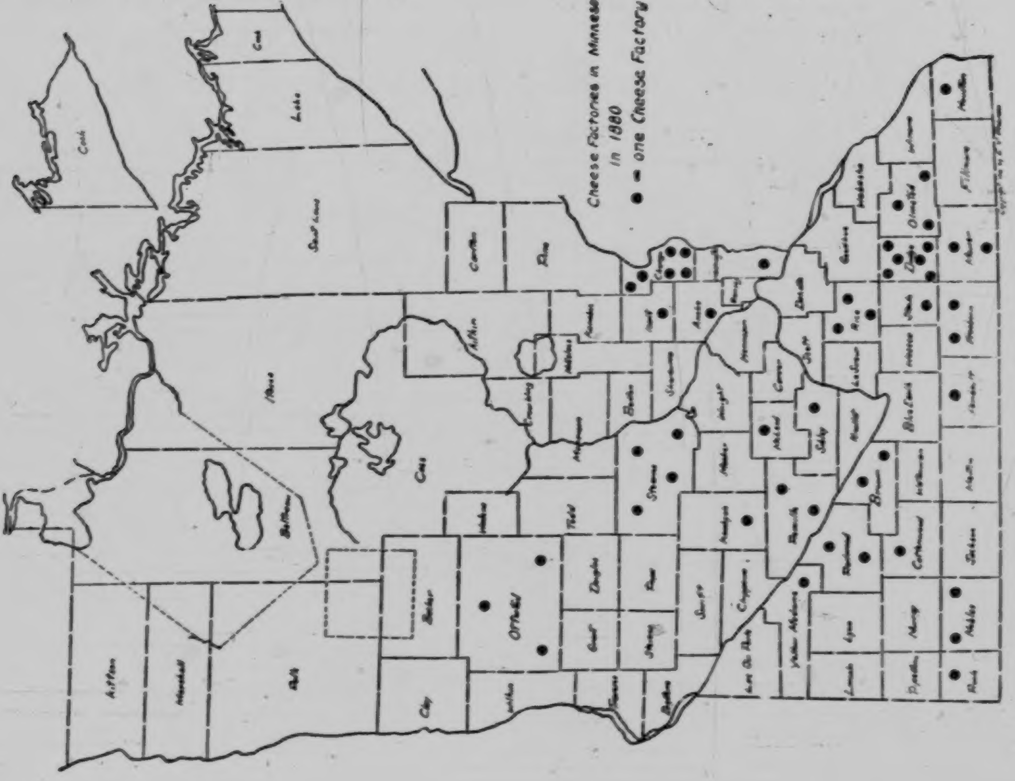
Cheese Factories in Minnesota in 1880
● = one Cheese Factory

Figure 79. Distribution of cheese factories by counties in 1880.[73]

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[73] Ibid., 1880, 62.

1879 at least one large establishment was converted from a cheese to a butter factory, owing to the better prices obtained for butter;[74] and it is possible that this happened in other cases. For 1880 an irreconcilable conflict exists between the state statistics, which show by counties 49 cheese factories,[75] and the census of that year, which reports only 27 cheese and butter factories combined. By reason of the greater definiteness of the state statistics, the inference is that the census report is incomplete; especially in view of the fact that the state statistics, being collected by the assessors, tended always to be too low rather than too high. It is, however, possible that the high price of butter had temporarily caused some of the cheese factories to close down. This hypothesis would also explain the sharp drop in the output of cheese in 1879 (Fig. 77). The distribution of cheese factories in 1880 according to the state statistics is shown in Fig. 78.

It should be noted that this map, like the one for 1876, gives the location by counties, but not by smaller civil units. A glance suffices to show that 28 of the 49 cheese factories reported for 1880 were located in two well-marked groups. One group was found in Dodge, Olmsted, and adjacent counties, in the heart of the original wheat belt, where mixed farming was becoming imperative; another in the district east of the Mississippi, where wheat farming never had been a success; while the remainder were scattered through the western counties toward the agricultural frontier. It is noticeable that few factories were found near the cities or, indeed, adjacent to the principal waterways. In such locations it was apparently more profitable to market milk or butter. On the other hand, cheese, being less perishable, could be produced to greater advantage in districts more remote from centers of population.

Distribution of population in in 1880

By 1880 settlement had extended west and northwest to the boundaries of the State. The northern half of the Red River Valley, however, was still very sparsely peopled, having but recently (1878) secured railroad connection with Duluth and Minneapolis[76] (Fig. 80). The population reported by the census was 780,773, an increase of 341,067 or 77.6 per cent over 1870, and 183,494 or 41.7 per cent (measured by 1870) over 1875. The increase was thus the more rapid during the latter half of the decade, in spite of the disastrous crop failure of 1876. This fact seems to indicate the cumulative effect of the new milling processes. So large a part of the newcomers had gone to increase the density of settlement in the older section that the bulk of the population was still found east and south of Stearns County, especially as 13 out of the 14 municipalities having 2,500 or more inhabitants were situated in the relatively small district between Winona, Mankato, Anoka, and Stillwater (Fig. 80).

The distribution is not materially altered by the elimination of all incorporated places (Fig. 81). Settlement was still, as in 1870, denser along the edge of the hardwood belt running northwest through Stearns, Douglas, and Otter Tail counties than in the purely prairie counties. On the other hand, it is evident that in 1880, thanks chiefly to the rapid extension of railroads, the settlement of the prairies was well under way.

Distribution of improved land in 1880

Computing the ratio of improved land at the census of 1880 to the area of the several counties, it appears that nine counties in the southeastern section, besides one (Nicollet) in the bend of the Minnesota, had between 60 and 80 per cent of their total land area under tillage or otherwise improved for farming. These counties from Mower and Fillmore to Dakota occupied the flat divide between the lower Minnesota and the Mississippi, extending also at places to both rivers. It will be noted that the driftless district in the southeast corner of the State, being more broken as to surface, showed a smaller percentage of improved land. On the west and northwest the percentage of such land also diminished toward the agricultural frontier, which began beyond Brown and Stearns counties. East of the Mississippi only Washington and Ramsey counties had as much as 20 per cent improved. In the extreme southwest, Rock County, which had been settled largely by way of the Missouri River and Iowa, had a materially larger percentage of land improved than the counties to the northeast on the Coteau des Prairies.

Distribution of agriculture according to the census of 1880

The acreage of wheat, first reported by the census in 1880, brings out perhaps more clearly than the production the westward spread of wheat growing (Fig. 83). It is interesting to note that the Coteau des Prairies across the southwestern corner of the State is clearly shown by the lesser acreage in wheat.

The average yield of wheat being approximately six bushels less per acre in 1879 than in 1869 (Fig. 71), the production of wheat in these two years does not tell the full story of the development during the decade (Figs. 59, 84). The bulk of the crop was still grown in the section south of the Minnesota River and east of Blue Earth County, though a notable westward extension of wheat growing was evident, especially north of the Minnesota River.

The acreage of oats showed about the same range as that of wheat, with distinctly less concentration in the southeastern section (Fig. 85). The yield of oats in 1879 was fairly comparable with that of 1869, being only about a bushel less per acre (Fig. 71). Comparing the total yield for the two years (Figs. 60, 86), it appears that oats had advanced westward about as fast as population and had also gained in most of the southeastern and south central counties, largely by reason of the increase in farming population (Table 10).

Barley in 1869 was almost entirely confined to the southeast (Fig. 61). By 1879 it had spread somewhat toward the west and northwest, as shown by the acreage (Fig. 87). From the production map, however, it is evident that some five or six southeastern counties, in the original wheat belt, had begun to make barley a leading crop (Fig. 88). This was undoubtedly a step away from the one-crop system, since barley, like wheat, is distinctly a market crop. The total yield of barley had more than doubled in the decade (Table 10), although the yield per acre was substantially the same (Fig. 71), indicating a corresponding increase of acreage.

Rye was grown in many counties (Table XVII), but in most of them on too small a scale to appear on the maps of acreage or production (Figs. 89, 90). While still a minor crop, it about tripled during the ten years, gaining especially on light soils, in

[74] *Ibid.*, 1880, 38. See also footnote 41.
[75] *Ibid.*, 62.
[76] *Ibid.*, 1878, 193, 208.

districts formerly wooded. For such localities it has the advantage, being usually planted in the autumn, of getting a good growth before the season of hot and dry weather.

The acreage of corn was mostly in the southern fourth of the State, south of Hennepin County (Fig. 91). From the maps of production, however, it appears that corn had advanced during the decade not only toward the west, bu also toward the northwest, being of some importance as far north as Otter Tail County (Figs. 63, 92). The total yield had more than tripled, implying a large increase of acreage, though not a proportionate increase, because the yield per acre was some four bushels larger than in 1869 (Fig. 71). The greatest density of corn growing was in the counties containing parts of the lower Mississippi and Minnesota bottom lands, and in the belt of lowland running south from the elbow of the Minnesota River.

The cultivation of potatoes had advanced west and northwest with the population (Figs. 64, 93). The total yield was more than double that of 1869 (Table 10); but this increase was due in part to a larger yield per acre. In 1869 potato bugs had destroyed much of the crop, but by 1879 means had been found of keeping them in check (Fig. 71). It will be noted that there was already a zone of somewhat greater density of potato growing about the cities. Among the other crops, flaxseed for the first time approached 100,000 bushels, having increased more than fivefold since 1870 (Table 10). All the counties producing as much as 10,000 bushels (Fig. 94) were in the prairie district of the southwest (page 10). The acreage and production of hay, as reported by the census, include both wild and tame varieties. Since hay was then cut chiefly for local use, the hay harvest was widely distributed (Figs. 95, 96).

The distribution of dairy cattle on farms also corresponded so closely to that of country population as to indicate that dairy products were as yet chiefly by-products of farming; that is to say, handled almost exclusively, except for the cheese factories, by the women and children.

On the basis of total value of farm products in 1870, the river counties with Olmsted and Fillmore, which for several years had enjoyed railroad connection with the river ports, were far in the lead; whereas by 1880, the interior counties of the southeast had risen to substantial equality with the previous leaders. There was also in evidence a notable westward extension of the value of farm products. On the whole, however, the bulk of the values as of the population was still found south and east of Stearns County.

Relation of population and farm products, 1870-1880

By way of summary of the agricultural development of the decade 1870-1880, a comparative table is presented at the end of this chapter giving for each product the amount, the percentage of increase or decrease during the decade, and its relation to the country population.

In Table 10 the most striking fact revealed is the beginning of the rush to the city, country population increasing only 65.8 per cent against 112.1 per cent for all incorporated places (Items 1, 2). Nevertheless, it was still true that the absolute increase of country population was 215,495 against 125,572 for town population. The first report on tenure made at this census showed 90.85 per cent of the farms operated by their owners.

Improved land increased over three times as fast as country population, gaining more rapidly than waste land and woodland, and resulting in nearly double as many acres of improved land per capita as in 1870. Since the best land, all things considered, was presumably used first, it would seem that the extensive margin of cultivation was descending; that is, some lands not absolutely first class were coming under the plow (Items 4, 7, 8, 12). The number of farms also outran the country population, though it failed to keep pace with the increase of total land in farms. As a consequence, the average size of farms rose from 139.4 to 145.1 acres. This change was presumably based on the increasing use of agricultural machinery, especially for planting and harvesting small grains (Items 9, 10, 11).

The greater efficiency of farming, due to machinery, is strikingly apparent in the crop returns, notwithstanding the element of uncertainty due to variation in seasons (Fig. 101) and possible variation in the proportion of country population engaged in occupations other than agriculture. Thus, the percentage of increase in the crop was greater than the increase in country population, not only for wheat and barley, but also for oats, rye, corn, potatoes, and flaxseed, besides various minor crops. Only buckwheat, beans, hops, flax fiber, market-garden products, sweet potatoes, and maple sugar failed to increase as rapidly as country population (Items 13-50 inclusive). All of these were crops of small importance; and in the case of garden produce the decrease shown by the census was probably unreal, being due to a difference of classification.

The rate of increase was especially striking in the case of several minor products, notably clover, grass seed, and fruit, which have subsequently gained more ground; also tobacco and sorghum, which began to be widely planted during the Civil War for home use. Tobacco never progressed beyond this stage; but about 1869 a new sorghum hybrid called "Minnesota Early Amber" was introduced and for some years men had visions of Minnesota competing with Louisiana in sugar.[77] A syrup factory was built at Morristown and a sugar factory at Dundas, in Rice County. It even became the fashion to suppress the word "sorghum" and refer to the new variety as "sugar cane." As a result of this development the output of sorghum syrup rose from 38,735 gallons in 1870 to 543,369 gallons in 1880. Climate is, however, a stubborn fact, and it became clear after a time that Minnesota is, on the average, neither warm nor dry enough for sorghum, which finds its best habitat in southern Kansas.[78]

The various classes of live stock also increased from two to three or even four times as fast as country population, except working oxen, which were then giving way to horses. Oxen, being less excitable than horses, were useful so long as roots, stumps, or stones were likely to be encountered; but when agriculture entered the prairies, and especially when expensive farm machinery began to be employed, it became profitable to use more rapid means of traction (Items 51-58).

Animal products, like live stock, increased more rapidly than country population. The increase of wool, however, was

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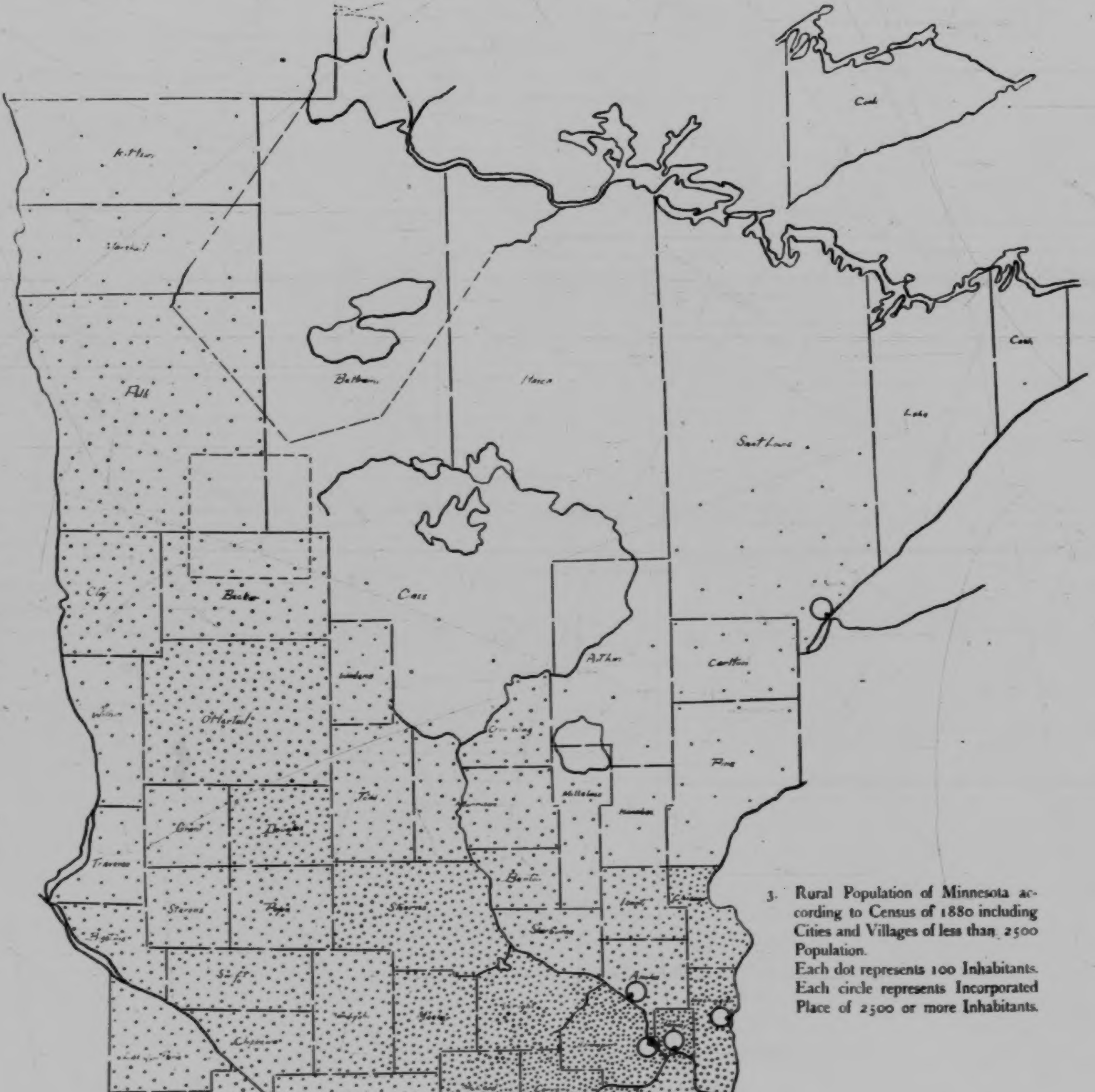
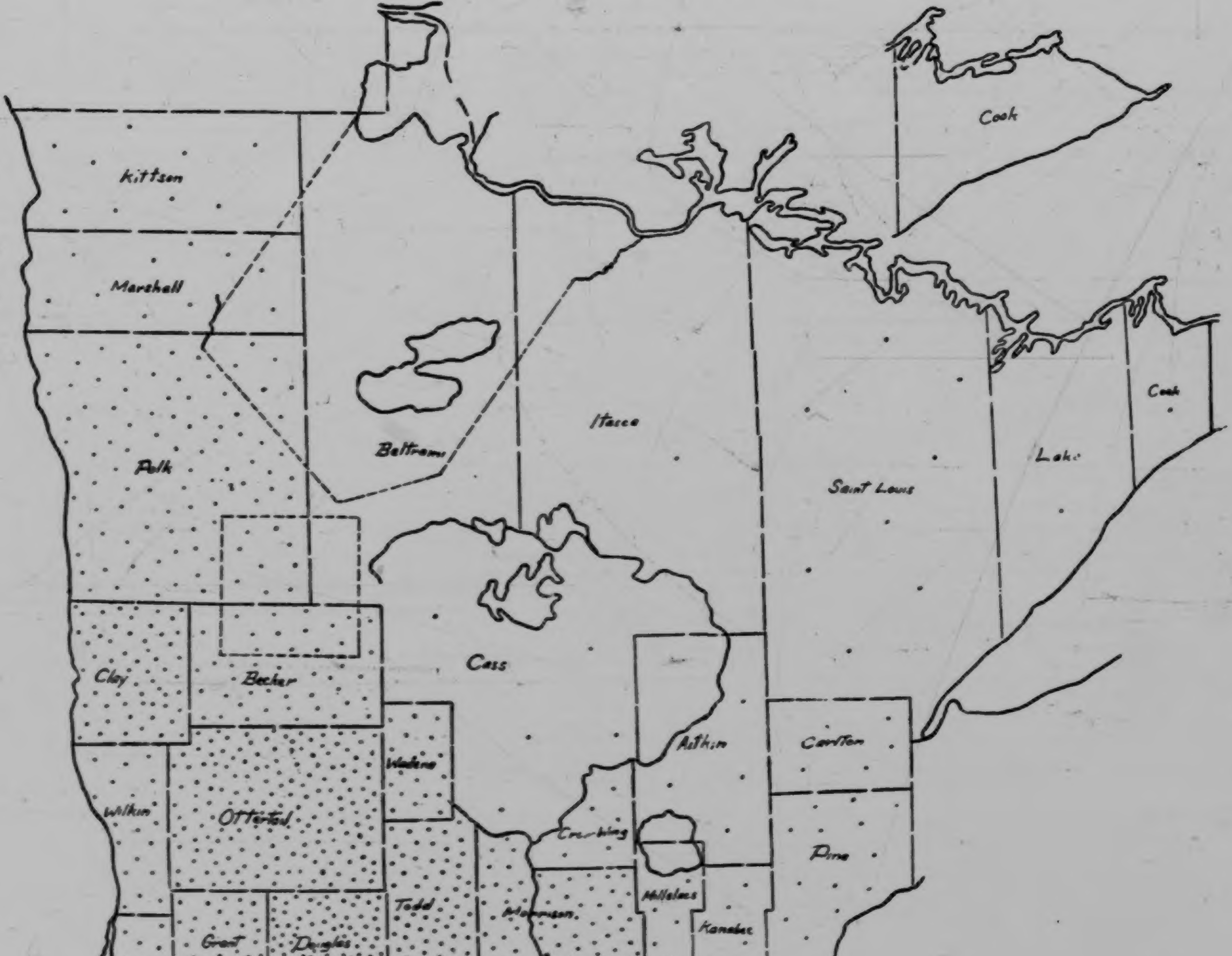
[77] *Ibid.*, 1877, 38, 47; 1878, 28-36; 1879, 24-25; 1880, 74-77.

[78] Abbe, C., *Climate and Crops*, 337. (Bul. 36, U. S. Weather Bureau).


Kittson
Marshall
Polk
Beltrami
Itasca
St Louis
Cook
Lake
Cook
Clay
Becker
Cass
Wadena
Aitkin
Carlton
Pine
Wilkin
Otter Tail
Crow Wing
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Stevens
Pope
Stearns
Benton
Sherburne
Isanti
Anoka
Big Stone
Swift
Kandiyohi
Meeker
Chippewa
Lac qui Parle
Yellow Medicine
Renville
Sibley
Lincoln
Lyon
Redwood
Brown
Blue Earth
Waseca
Steele
Dodge
Pipestone
Murray
Cottonwood
Watonwan
Rock
Nobles
Jackson
Martin
Fillmore
Houston

3. Rural Population of Minnesota according to Census of 1880 including Cities and Villages of less than 2500 Population.
Each dot represents 100 Inhabitants.
Each circle represents Incorporated Place of 2500 or more Inhabitants.

Figure 80. Population in 1880. (Based on Table XI)


Kittson
Marshall
Polk
Beltrami
Itasca
Saint Louis
Cook
Lake
Cook
Cass
Clay
Becker
Wadena
Aitkin
Carlton
Wilkin
Ottertail
Crow Wing
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Sherburne
Big Stone
Swift
Anoka
Washington
Kandiyohi
Meeker
Wright
Ramsey
Hennepin
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Houston

10. Country Population of Minnesota according to Census of 1880 excluding all Incorporated places. Each dot represents 100 inhabitants

Figure 81. Population outside of incorporated places in 1880. (Based on Table XI)

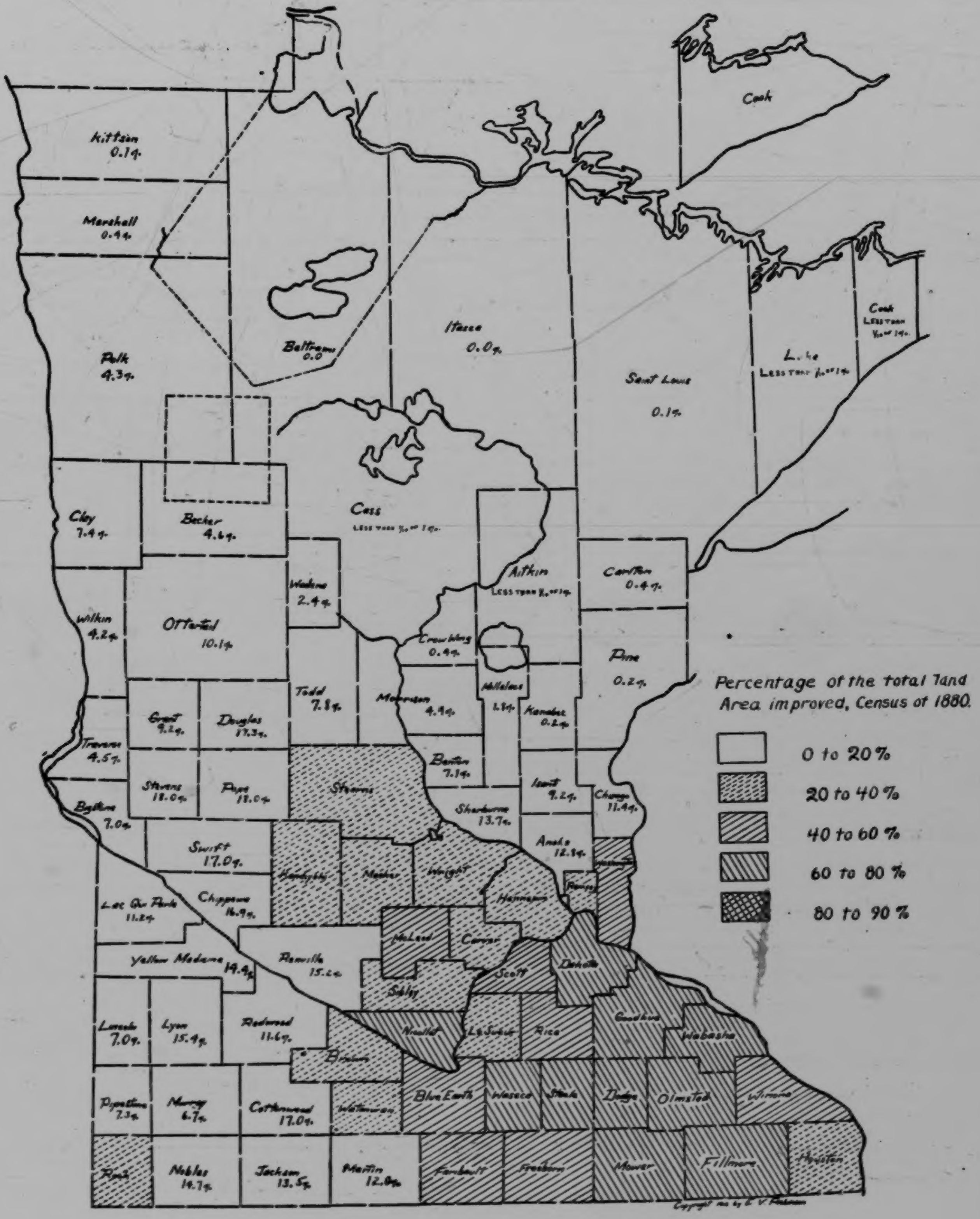
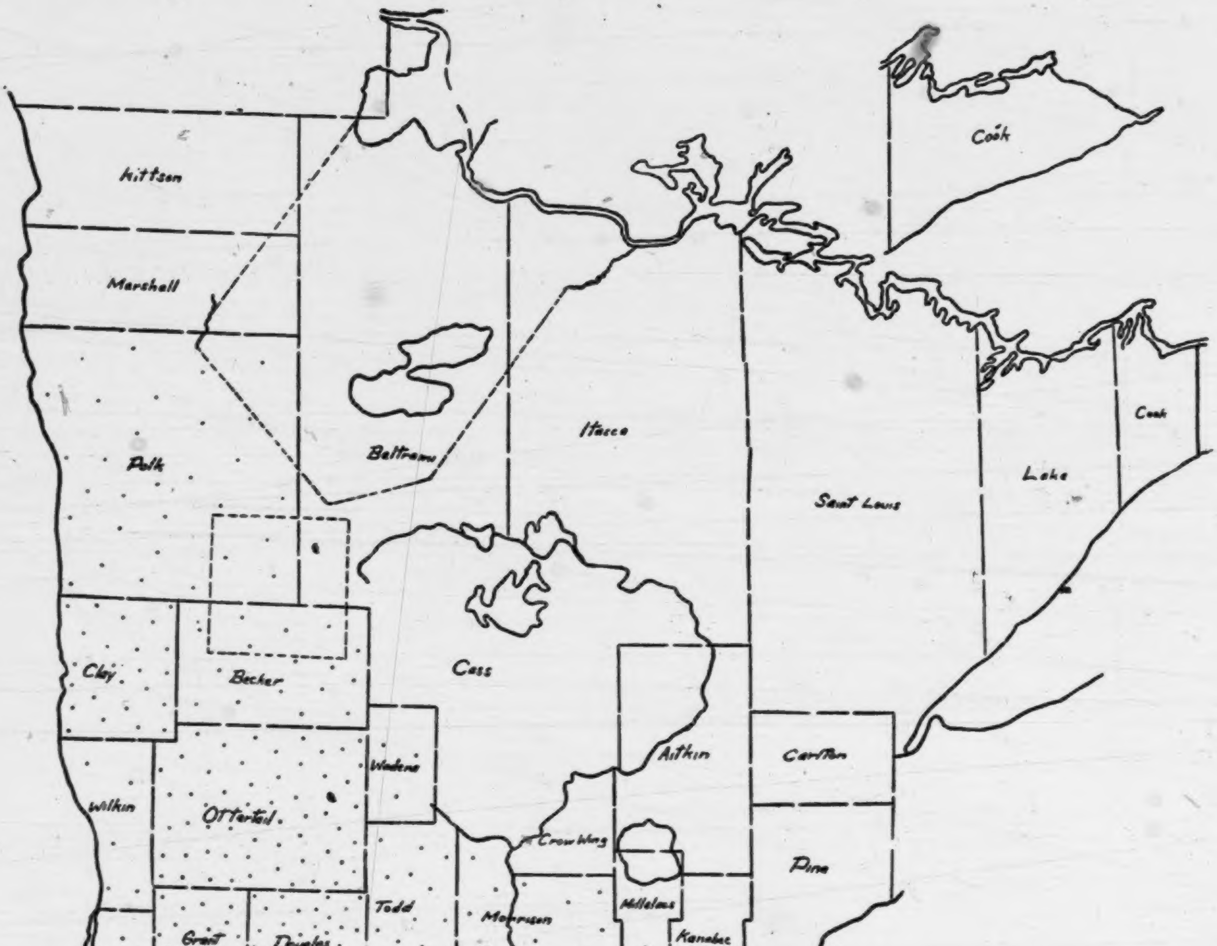

Kittson 0.1%
Marshall 0.4%
Polk 4.3%
Beltrami 0.0
Itasca 0.0%
Cook
Saint Louis 0.1%
Lake Less than 1/10 of 1%
Cook Less than 1/10 of 1%
Cass Less than 1/10 of 1%
Clay 7.4%
Becker 4.6%
Aitkin Less than 1/10 of 1%
Carlton 0.4%
Wadena 2.4%
Wilkin 4.2%
Ottertail 10.1%
Crow Wing 0.4%
Pine 0.2%
Todd 7.8%
Morrison 4.9%
Mille Lacs 1.8%
Kanabec 0.2%
Grant 9.2%
Douglas 17.3%
Traverse 4.5%
Benton 7.1%
Stevens 18.0%
Pope 18.0%
Stearns
Isanti 9.2%
Chisago 11.4%
Big Stone 7.0%
Sherburne 13.7%
Anoka 12.8%
Swift 17.0%
Kandiyohi
Meeker
Wright
Washington
Ramsey
Hennepin
Lac Qui Parle 11.2%
Chippewa 16.9%
McLeod
Carver
Yellow Medicine 14.4%
Renville 15.2%
Scott
Dakota
Sibley
Lincoln 7.0%
Lyon 15.4%
Redwood 11.6%
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone 7.3%
Murray 6.7%
Cottonwood 17.0%
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles 14.7%
Jackson 13.5%
Martin 12.0%
Faribault
Freeborn
Mower
Fillmore
Houston
Percentage of the total land Area improved, Census of 1880.
0 to 20%
20 to 40%
40 to 60%
60 to 80%
80 to 90%
Copyright by E. V. Robinson

Figure 82. Percentage of total land area improved for farming purposes in 1880.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Aitkin
Carlton
Crow Wing
Pine
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Douglas
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Kanabec
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Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

60. Acreage of Wheat in Minnesota according to Census of 1880.
Each dot represents 1,000 acres

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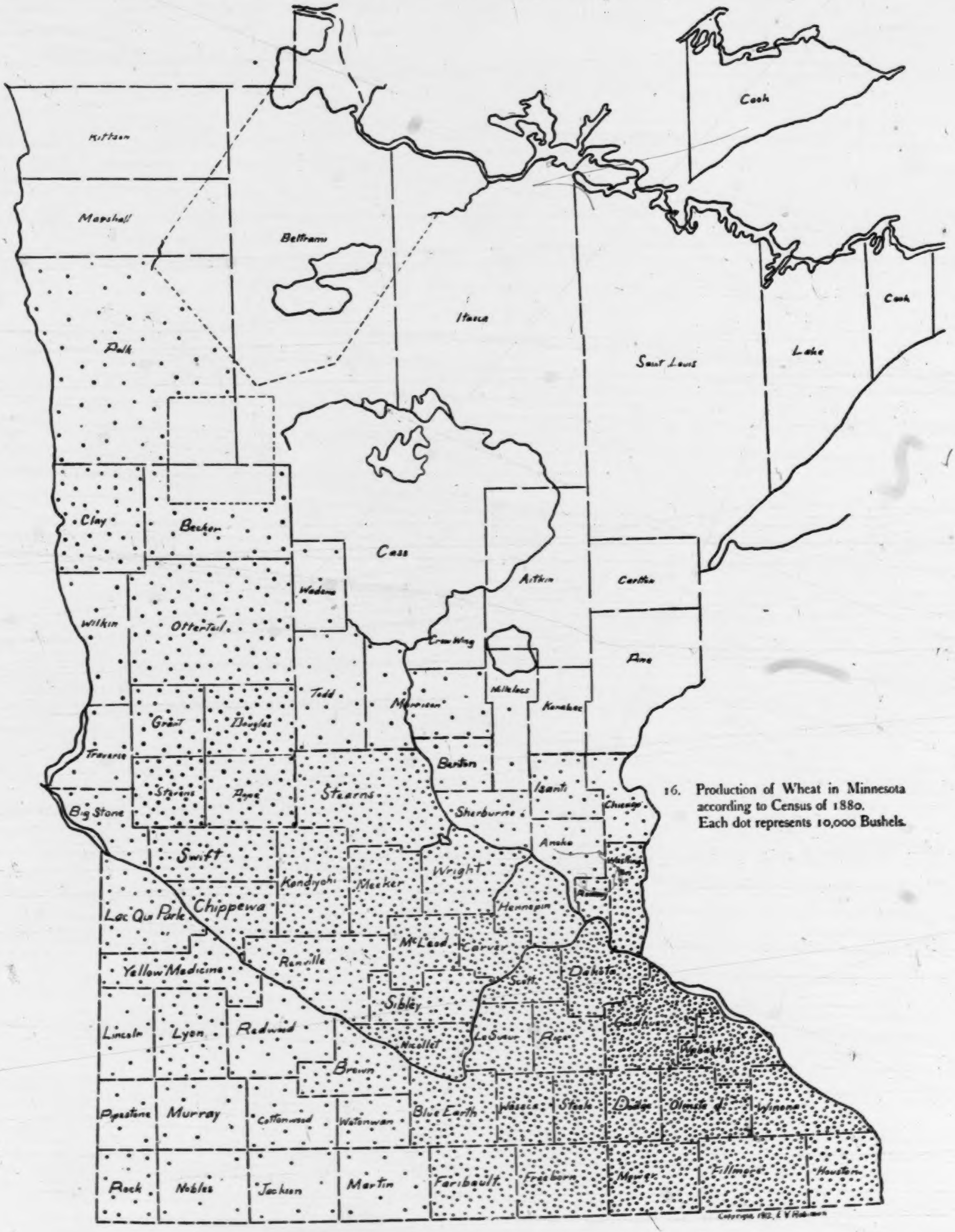
Figure 83. Acreage of wheat in 1879 according to census of 1880. (Based on Table XIII)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Clay
Becker
Cass
Wadena
Aitkin
Carlton
Wilkin
Otter Tail
Crow Wing
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Todd
Morrison
Mille Lacs
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Hennepin
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Renville
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Dakota
Sibley
Goodhue
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Lyon
Redwood
Nicollet
Le Sueur
Rice
Wabasha
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Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
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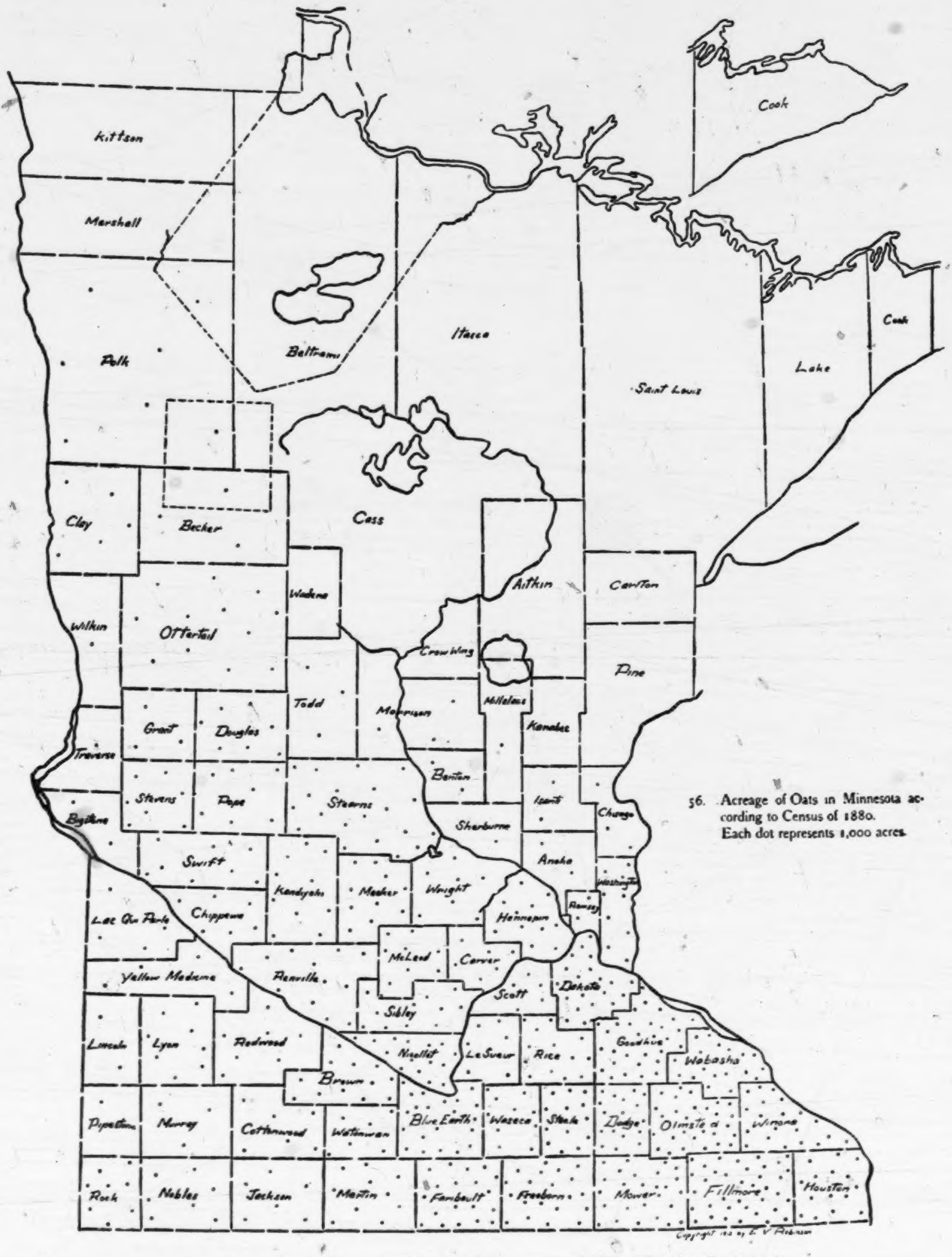
16. Production of Wheat in Minnesota according to Census of 1880. Each dot represents 10,000 Bushels.

Figure 84. Production of wheat in 1879 according to census of 1880. (Based on Table XIII)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Crow Wing
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Chippewa
McLeod
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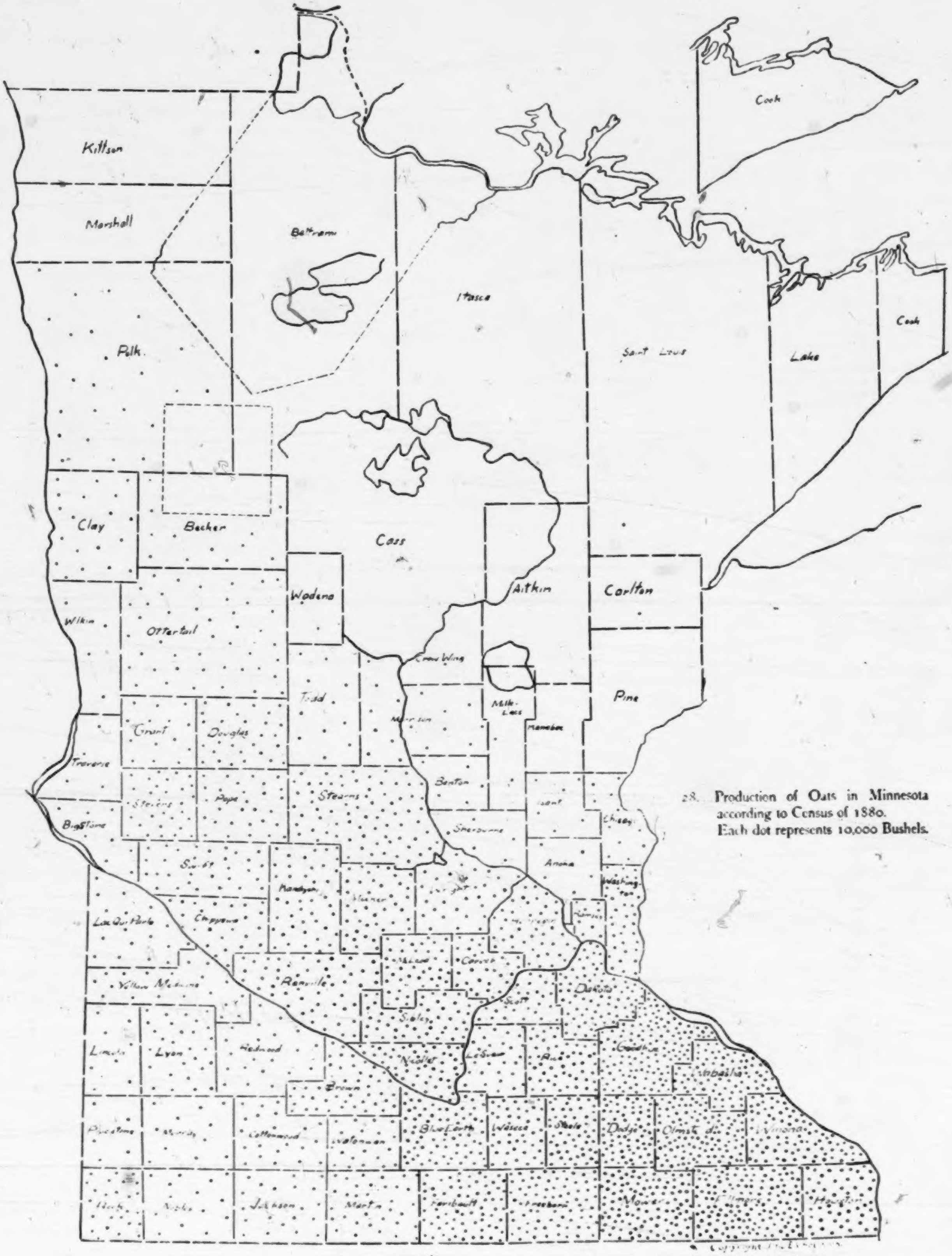
Nicollet
Le Sueur
Rice
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Copyright [illegible] by E. V Robinson

56. Acreage of Oats in Minnesota according to Census of 1880.
Each dot represents 1,000 acres.

Figure 85. Acreage of oats in 1879 according to census of 1880. (Based on Table XIV)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Becker
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Ottertail
Todd
Crow Wing
Morrison
Mille Lacs
Kanabec
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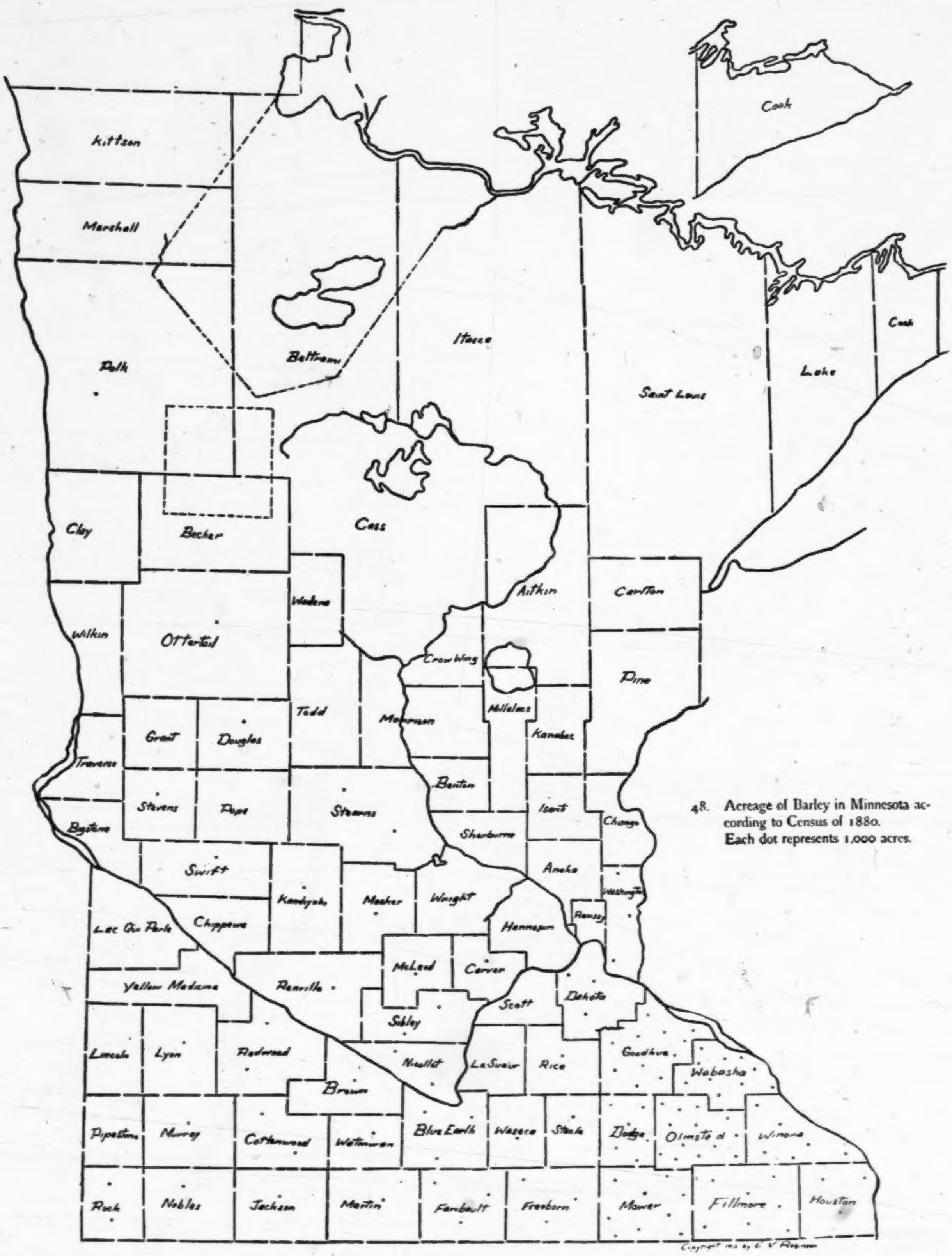
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Copyright

28. Production of Oats in Minnesota according to Census of 1880.
Each dot represents 10,000 Bushels.

Figure 86. Production of oats in 1879 according to the census of 1880. (Based on Table XIV)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Clay
Becker
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Aitkin
Carlton
Wilkin
Otter Tail
Wadena
Crow Wing
Pine
Grant
Douglas
Todd
Morrison
Mille Lacs
Kanabec
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Big Stone
Sherburne
Swift
Anoka
Kandiyohi
Meeker
Wright
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Ramsey
Lac Qui Parle
Chippewa
Hennepin
McLeod
Carver
Yellow Medicine
Renville
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Dakota
Sibley
Goodhue
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Lyon
Redwood
Nicollet
Le Sueur
Rice
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

48. Acreage of Barley in Minnesota according to Census of 1880.
Each dot represents 1,000 acres.

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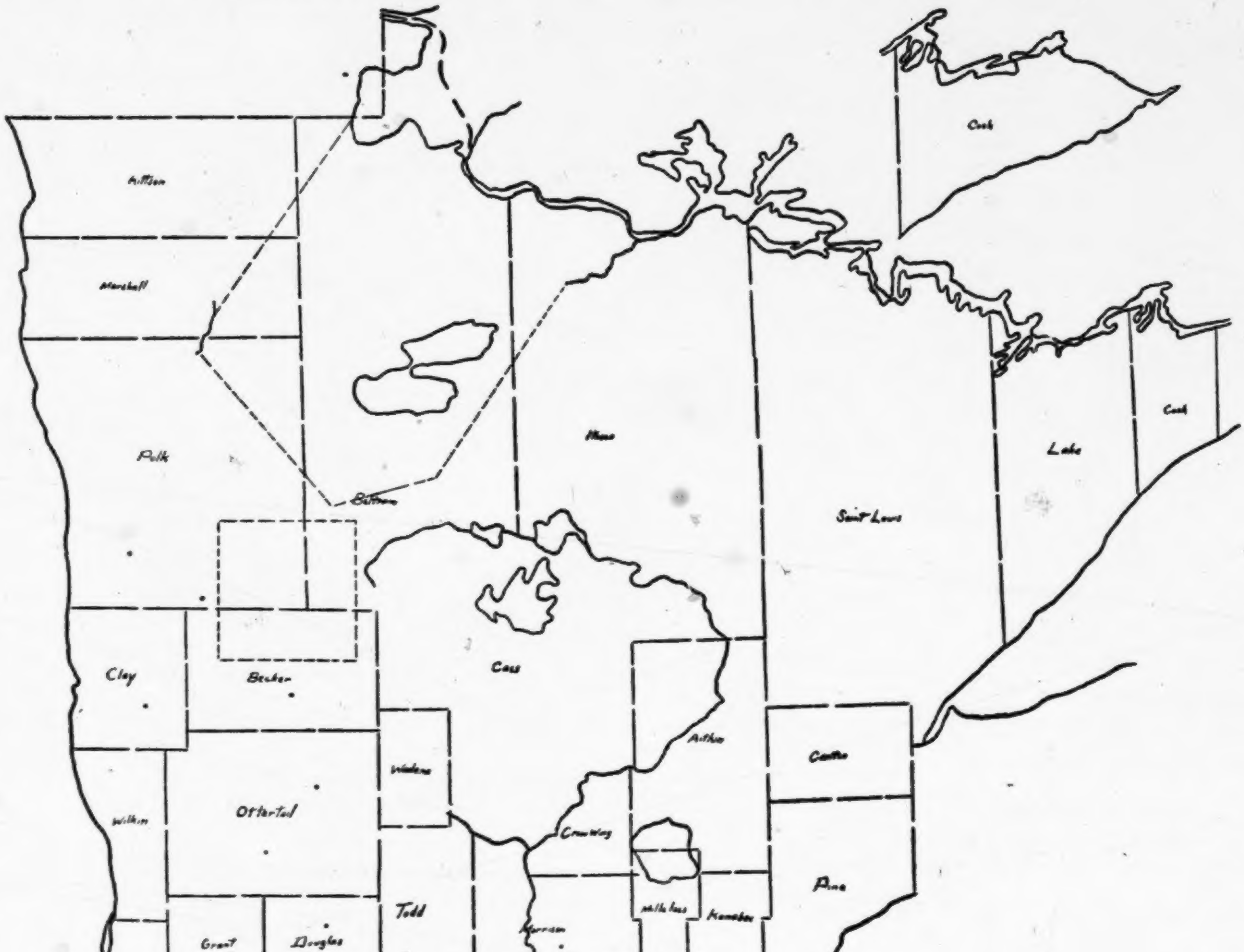
Figure 87. Acreage of barley in 1879 according to the census of 1880. (Based on Table XVI)


Kittson
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Ottertail
Crow Wing
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Mille Lacs
Kanabec
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Stearns
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Chisago
Sherburne
Big Stone
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Kandiyohi
Meeker
Wright
Anoka
Washington
Ramsey
Hennepin
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Renville
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Dakota
Sibley
Goodhue
Wabasha
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
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Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

34. Production of Barley in Minnesota according to Census of 1880.
Each dot represents 10,000 Bushels.

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Figure 88. Production of barley in 1879 according to the census of 1880. (Based on Table XVI)

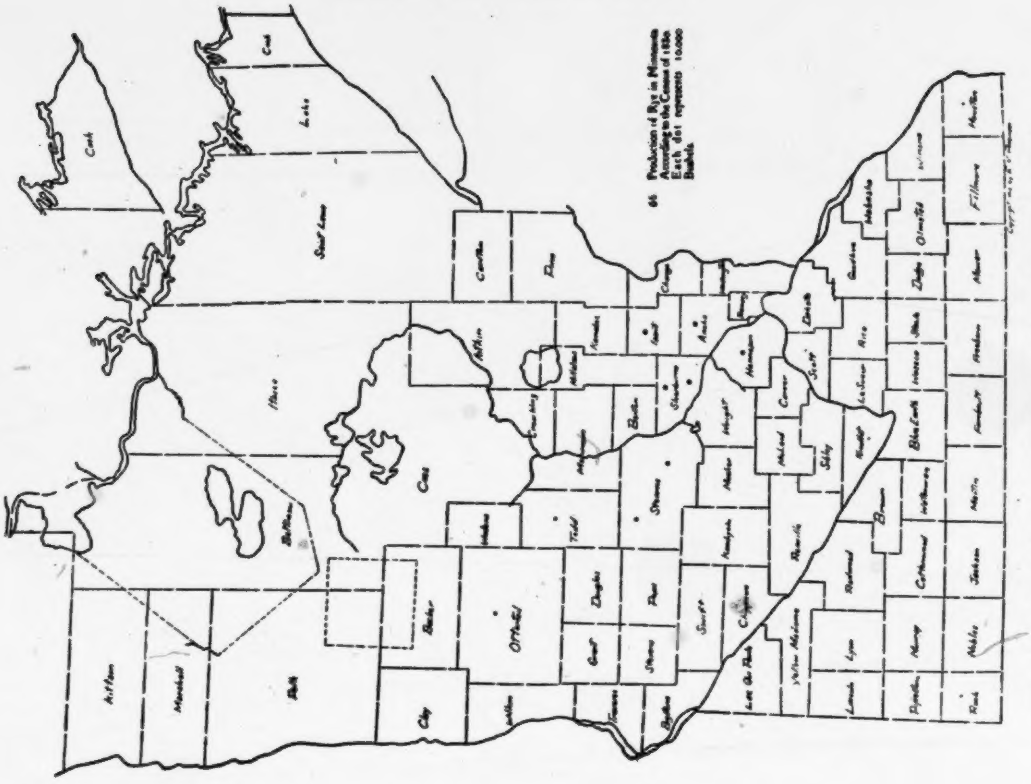

65 Production of Rye in Minnesota According to the Census of 1880 Each dot represents 10,000 Bushels.

Figure 90. Production of rye in 1879 according to the census of 1880. (Based on Table XVII)

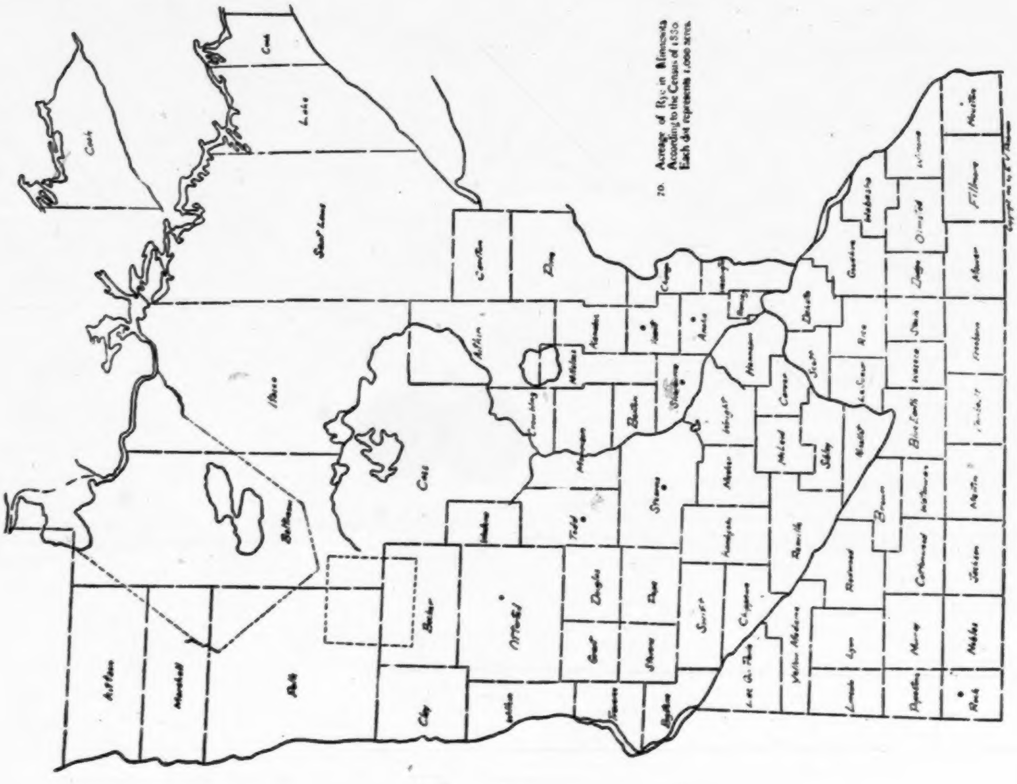
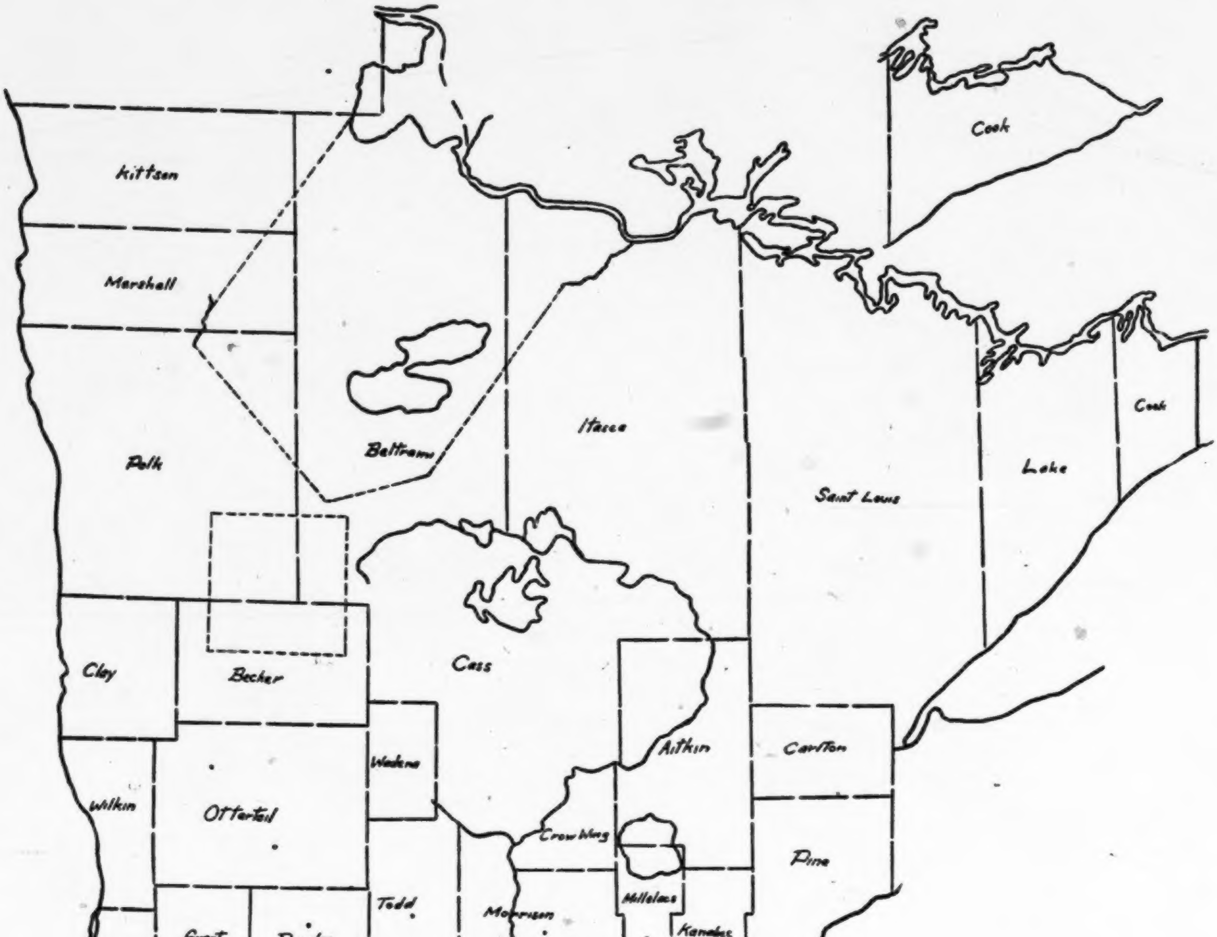

20. Acreage of Rye in Minnesota According to the Census of 1880 Each dot represents 1,000 acres.

Figure 89. Acreage of rye in 1879 according to census of 1880. (Based on Table XVIII)


Cook
Kittson
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Beltrami
Itasca
Saint Louis
Lake
Cook
Clay
Becker
Cass
Aitkin
Carlton
Wadena
Wilkin
Ottertail
Crow Wing
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
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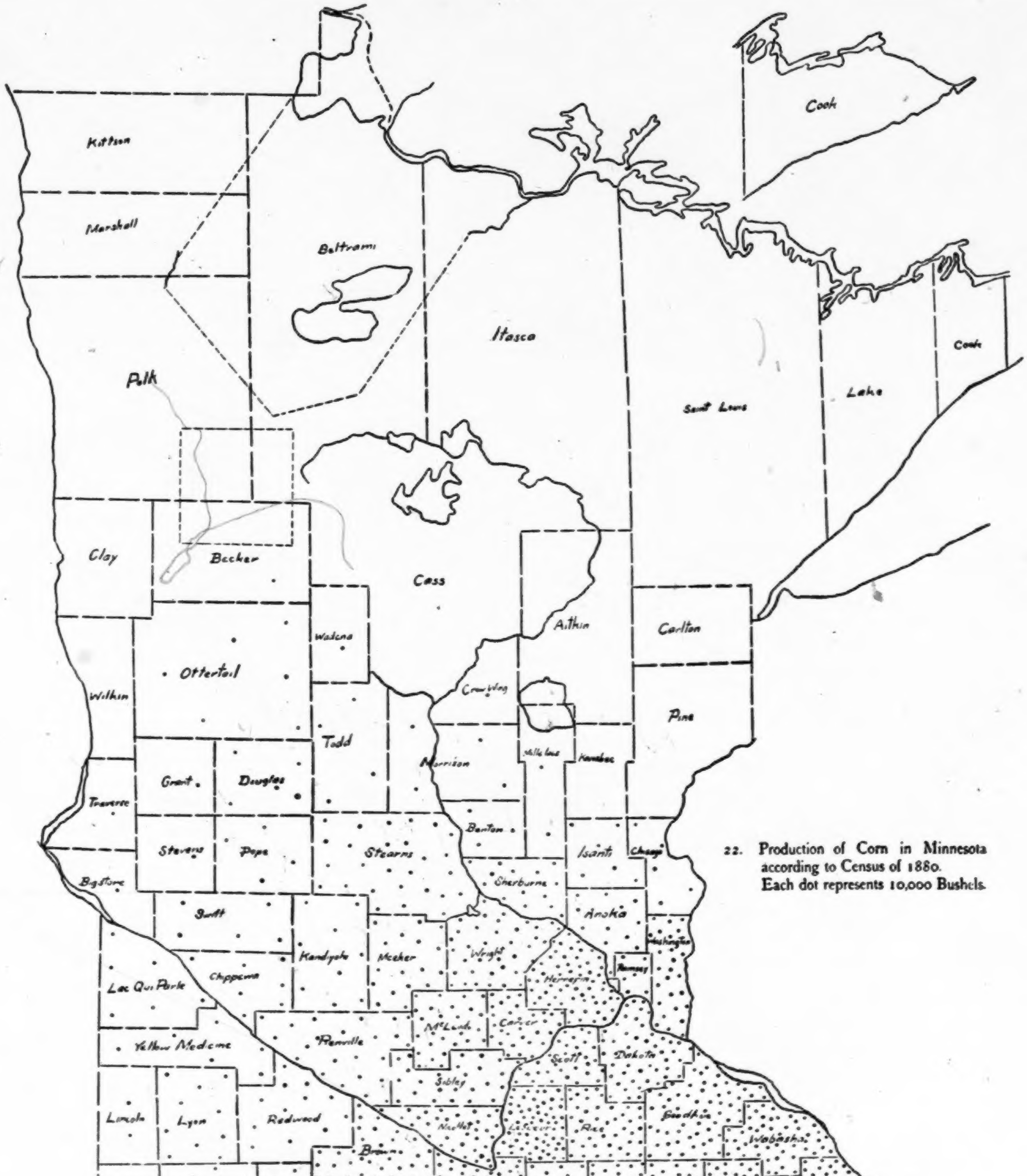
Stevens
Pope
Stearns
Isanti
Chisago
Big Stone
Sherburne
Anoka
Swift
Kandiyohi
Meeker
Wright
Washington
Ramsey
Lac Qui Parle
Chippewa
Hennepin
McLeod
Carver
Yellow Medicine
Renville
Dakota
Scott
Sibley
Lincoln
Lyon
Redwood
Goodhue
Nicollet
Le Sueur
Rice
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

52. Acreage of Corn in Minnesota according to Census of 1880.
Each dot represents 1,000 acres.

Figure 91. Acreage of corn in 1879 according to the census of 1880. (Based on Table XV)


Kittson
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Carlton
Wadena
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Wilkin
Crow Wing
Pine
Todd
Grant
Douglas
Morrison
Mille Lacs
Kanabec
Traverse
Benton
Stevens
Pope
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Isanti
Chisago
Sherburne
Big Stone
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Anoka
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Kandiyohi
Meeker
Wright
Hennepin
Ramsey
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Chippewa
McLeod
Carver
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Yellow Medicine
Sibley
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Nicollet
Le Sueur
Rice
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
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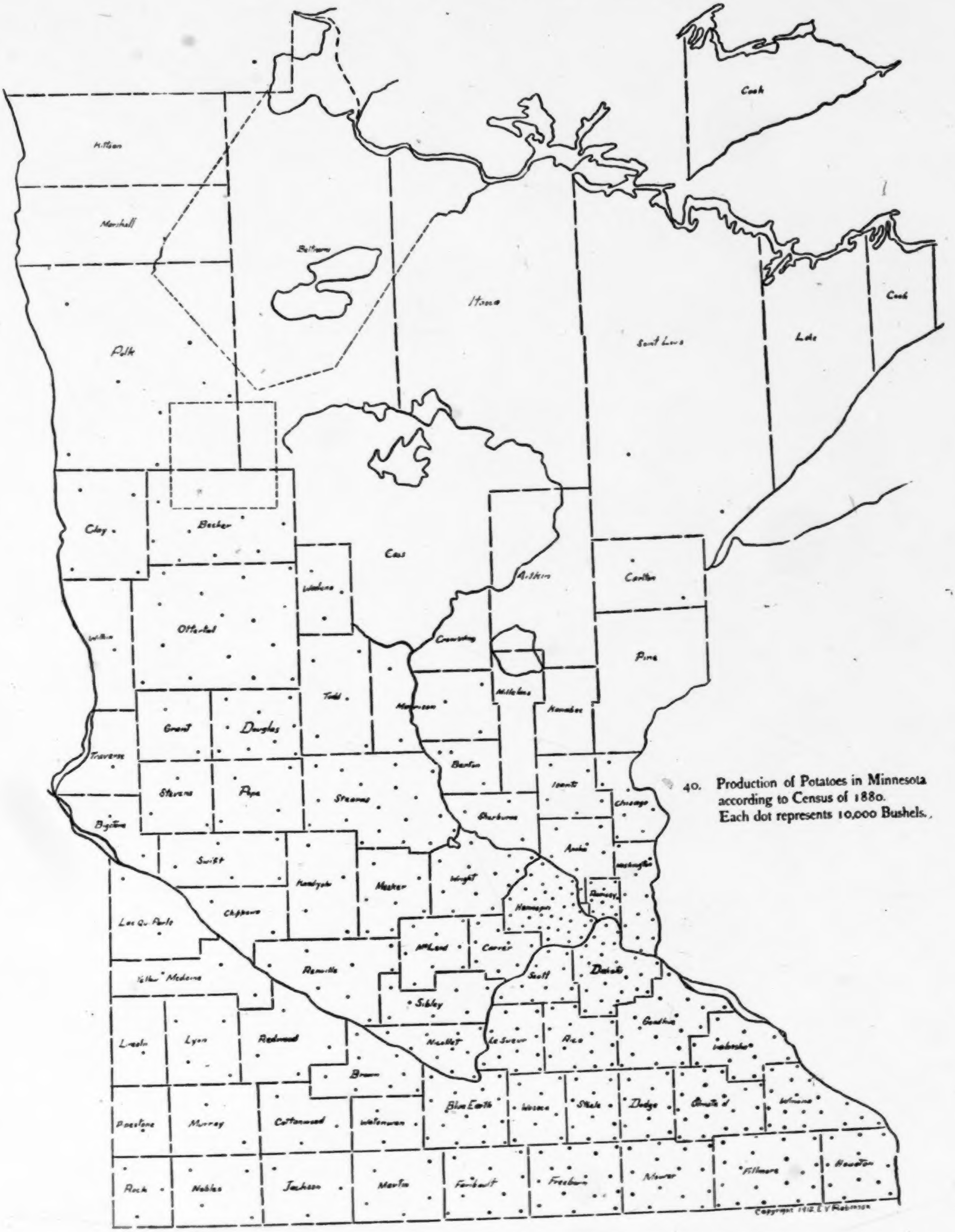
22. Production of Corn in Minnesota according to Census of 1880.
Each dot represents 10,000 Bushels.

Figure 92. Production of corn in 1879 according to the census of 1880. (Based on Table XV)


Cook
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Itasca
Saint Louis
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Crow Wing
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Morrison
Mille Lacs
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Sherburne
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Washington
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Lac Qui Parle
Chippewa
McLeod
Carver
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Rice
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Blue Earth
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Olmsted
Winona
Pipestone
Murray
Cottonwood
Watonwan
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
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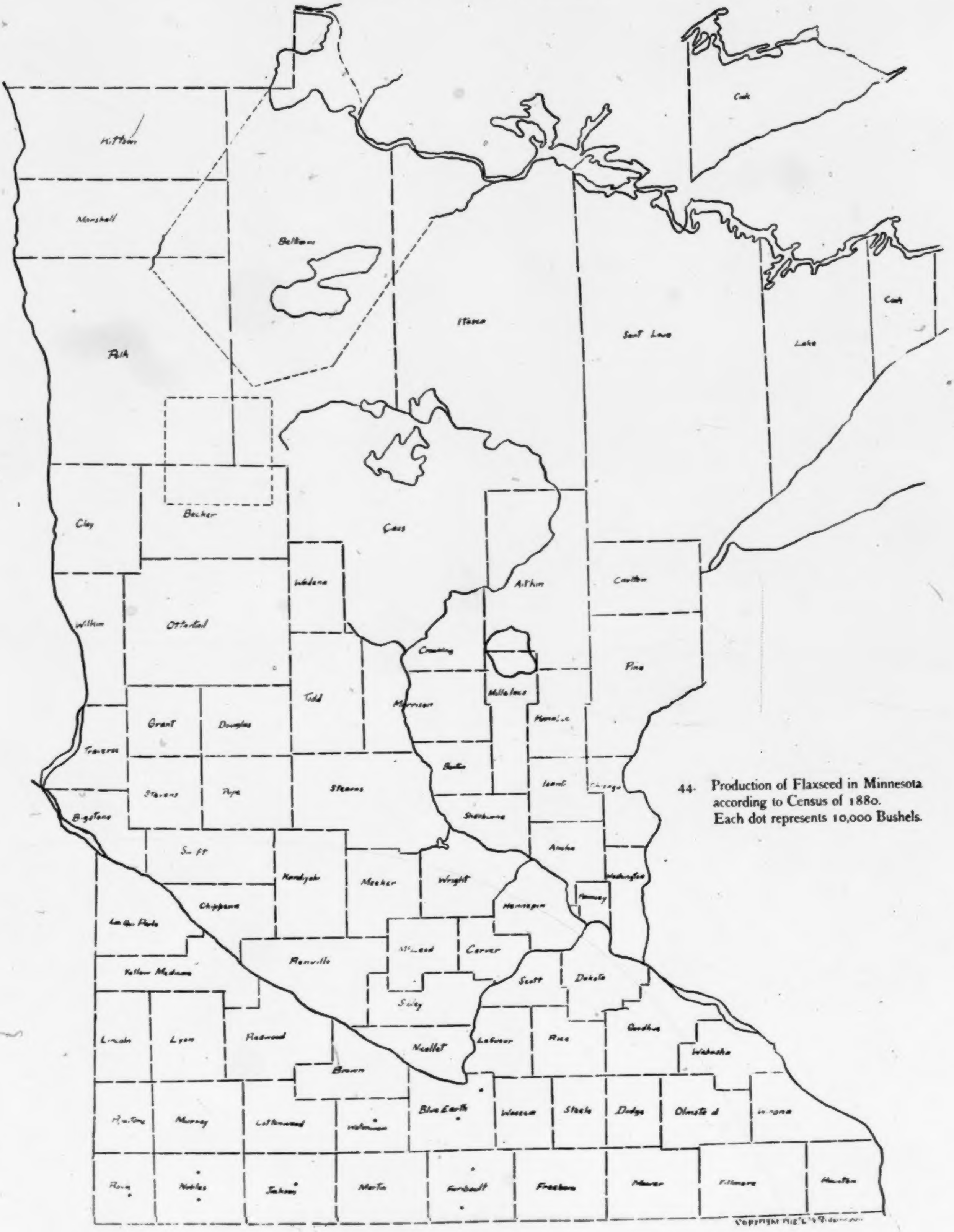
40. Production of Potatoes in Minnesota according to Census of 1880. Each dot represents 10,000 Bushels.

Figure 93. Production of potatoes in 1879 according to census of 1880. (Based on Table XVIII)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Blue Earth
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Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

44. Production of Flaxseed in Minnesota according to Census of 1880.
Each dot represents 10,000 Bushels.

Copyright [illegible]

Figure 94. Production of flaxseed in 1879 according to census of 1880. (Based on Table XIX)

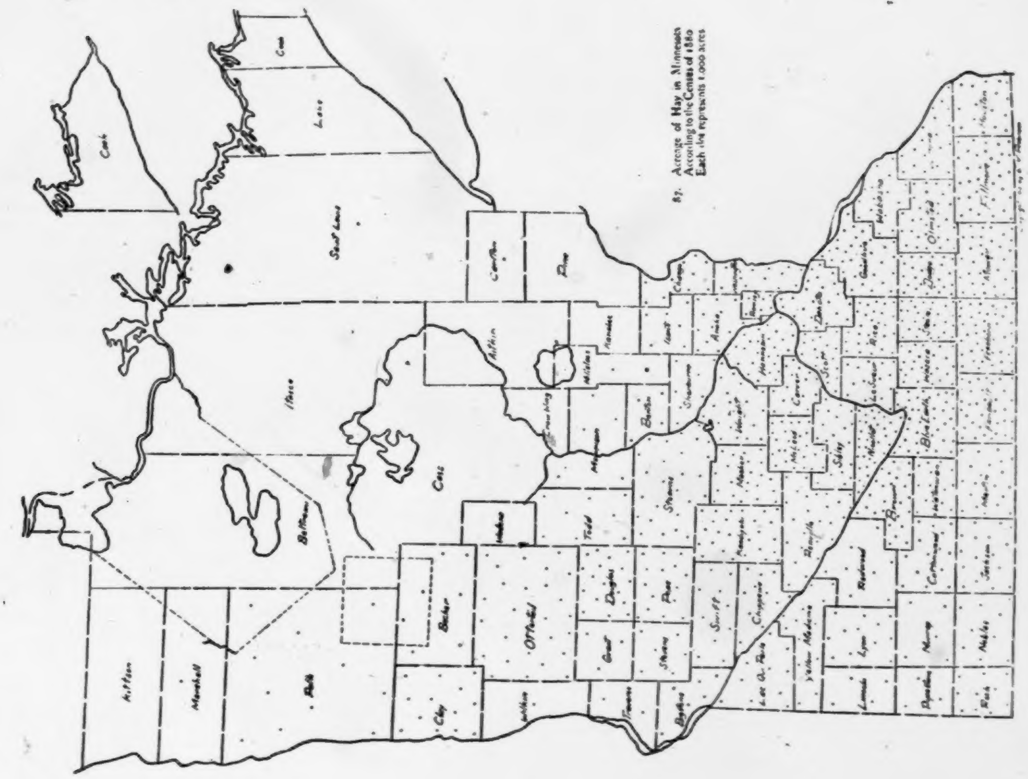

82. Acreage of Hay in Minnesota
According to the Census of 1880
Each dot represents 1,000 acres

Figure 95. Acreage of hay (wild and cultivated) in 1879 according to census of 1880.

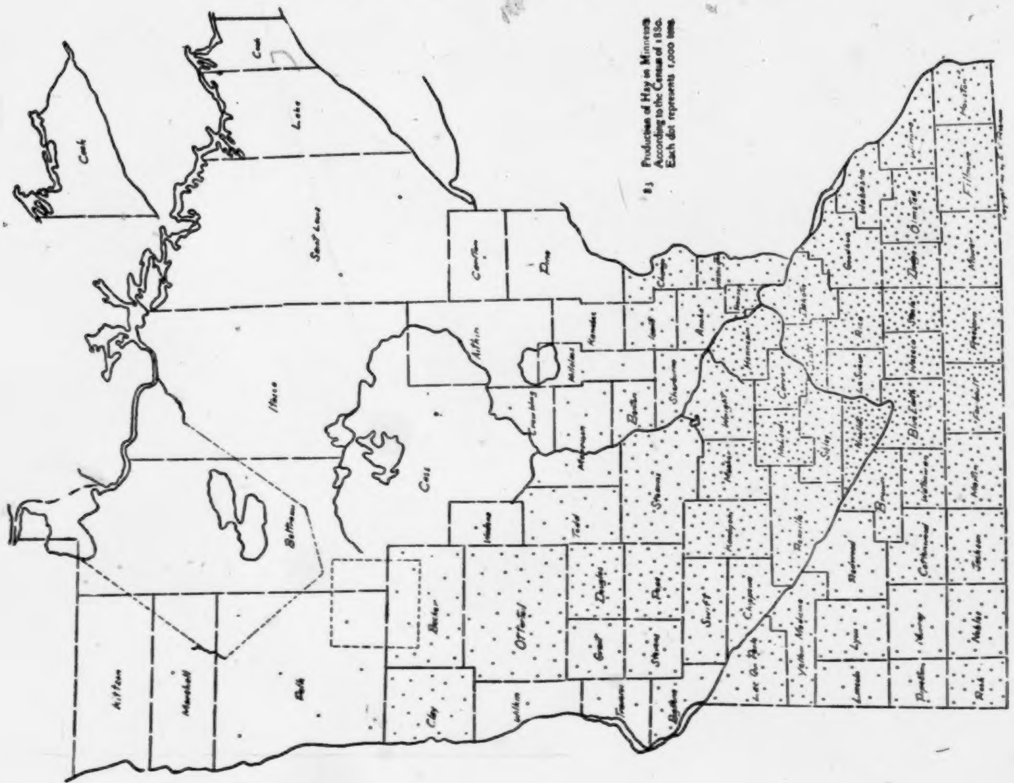
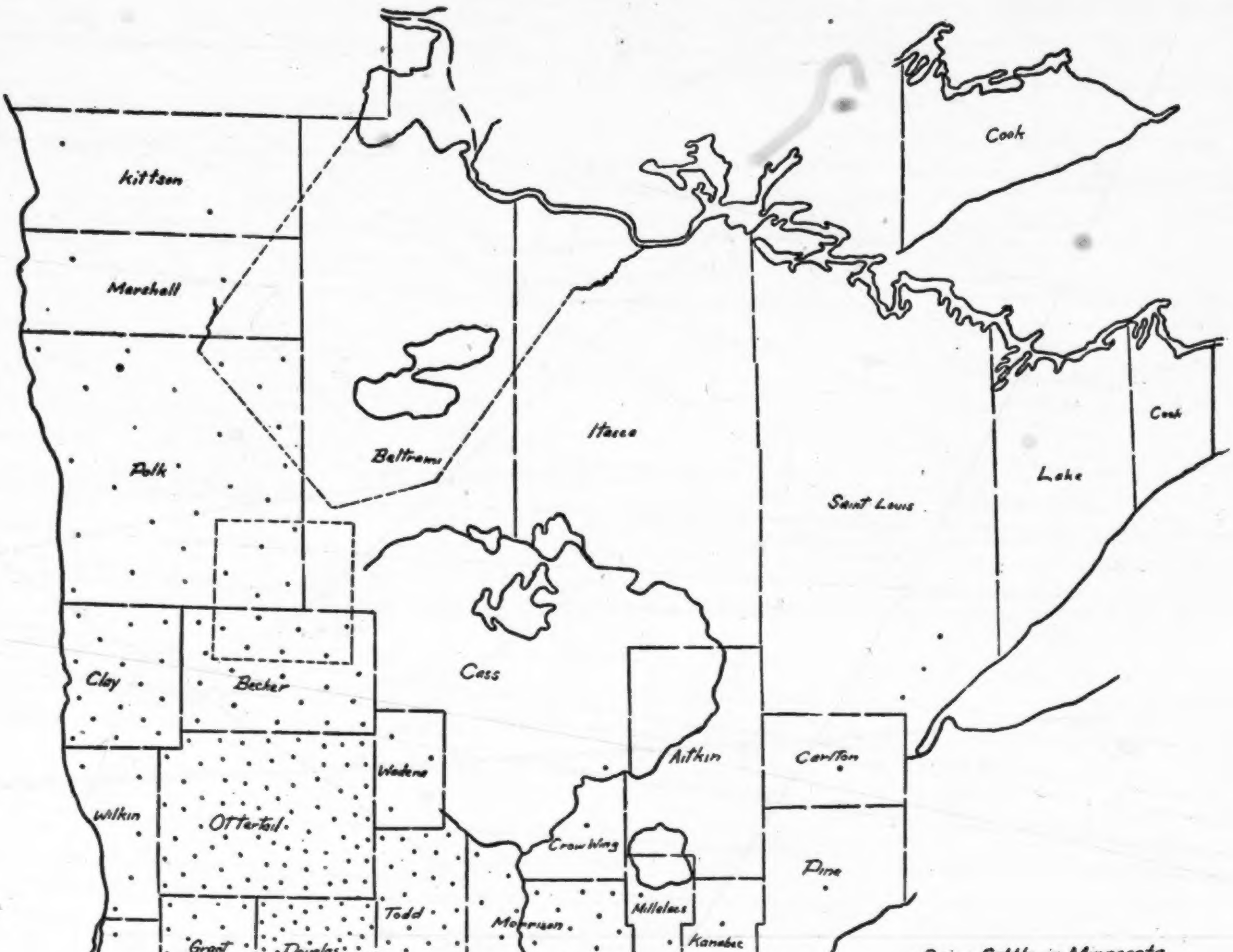

83. Production of Hay in Minnesota
According to the Census of 1880.
Each dot represents 1,000 tons

Figure 96. Production of hay (wild and cultivated) in 1879 according to the census of 1880.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Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Dairy Cattle in Minnesota
According to Census of 1880
Each dot represents 100 Cows
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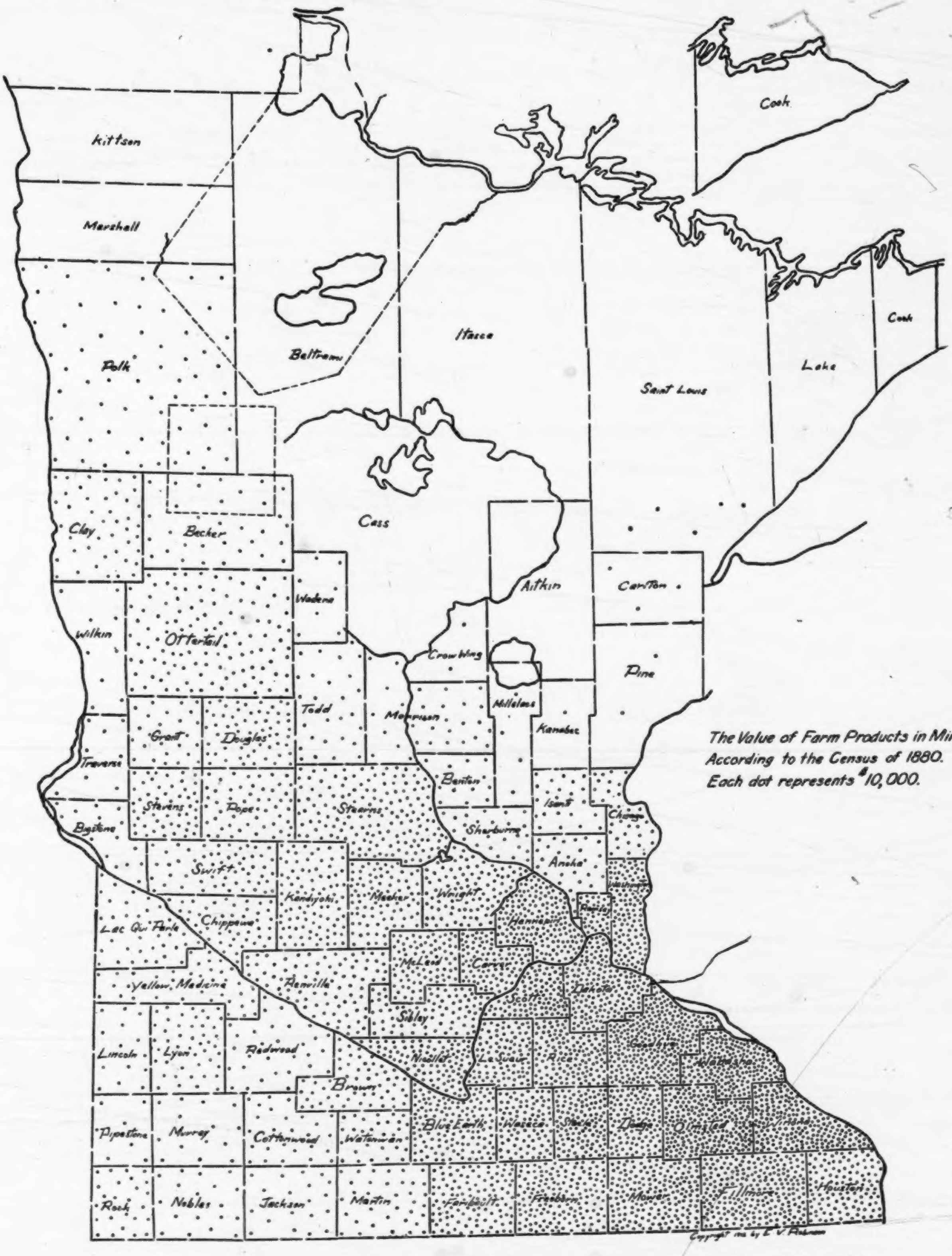
Figure 97. Distribution of dairy cows on farms according to census of 1880. (Based on Table XXIV)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Crow Wing
Mille Lacs
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Lac Qui Parle
Chippewa
McLeod
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Cottonwood
Watonwan
Blue Earth
Waseca
Steele
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Olmsted
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Nobles
Jackson
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Faribault
Freeborn
Mower
Fillmore
Houston
The Value of Farm Products in Minnesota
According to the Census of 1880.
Each dot represents $10,000.
Copyright 1926 by E. V. Peterson

Figure 98. Total value of farm products in 1879 according to the census of 1880. (Based on Table XXXV)

more than twice as rapid as the gain in sheep (Fig. 76). In the case of dairy products, the greatest ratio of increase was in milk sold, on account of the development of large cities; and next to that, in cheese, especially if both farm and factory products be included. In actual pounds, however, by far the largest increase was in butter (Items 59-69).

In spite of the increase of technical efficiency shown by the ratio of population to products and live stock, or perhaps in part by reason of such greater efficiency in the country at large, values did not increase, from 1870 to 1880, in proportion to products. Thus, the value of farm products rose only 47.9 per cent, the value of live stock 58.6 per cent, and the value of farms 98 per cent, against an increase of 65.8 per cent in country population, 94.8 per cent in value of farm machinery, 106.7 per cent in total acreage of farm land, and 212.1 per cent in acreage of improved land (Items 70-76). One cause of this unfavorable showing was of course the depreciated currency and consequent inflation of prices in 1870. The amount of such inflation has been estimated by the census at 20 per cent; but even when the gold values for 1870 are used, there was very little increase in value of farm products per capita of the country population, from 1870 to 1880, while there was an actual decline of such value per acre of farm land and especially per acre of improved farm land. The value of farms, on the other hand, increased considerably per capita of the country population and also per acre included in farms; but failed, as during the previous decade, to keep pace with the increase of improved land.

This decline in value of products per acre and the failure of farm values to advance as rapidly as the acreage of improved land presumably resulted from one fundamental cause—the relative overproduction of farm products and consequent downward trend of prices, which affected even wheat in spite of the new milling processes.

The same condition of agricultural depression thus existed in Minnesota during the seventies as in other western states, though apparently in a less extreme form. As a result, farmers, on the average, found themselves able to accumulate little except through the rise in value of their lands. The inference seems warranted that it was this relative unprofitableness of agriculture which started the rush to the cities and likewise furnished the motive power both of the Granger movement to regulate railroad rates, and of the several cheap money campaigns designed to check the fall of prices.

TABLE 9.—Progress of Agriculture, 1860-1870, from U. S. Census

Items	1860	1870	Percentage of increase or decrease (a minus sign denotes a decrease)	Per 100 of country population	
				1860	1870
I. Population:			%		
1. Country population	122,530	327,698	167.4	....	....
2. Town population	49,493	112,008	126.3	....	....
3. Total population	172,023	439,706	155.7	....	....
II. Acreage:					
4. Improved land in farms, acres	556,250	2,322,102	317.2	454.0	708.63.
5. Unimproved land in farms, acres	2,155,718	4,161,726	93.1	1,759.3	1,270.0
6. Total land in farms, acres	2,711,968	6,483,828	139.3	2,213.3	1,978.6
7. Number of farms	17,999*	46,500	158.4	14.7	14.2
8. Average size of farms, acres	150.7	139.4	—7.5	....	....
9. Average improved land per farm, acres	30.9	49.9	61.5	....	....
III. Farm products:					
10. Wheat, bushels	2,186,973*	18,866,073	762.7	1,784.9	5,757.3
11. Oats, bushels	2,176,002	10,678,261	390.7	1,775.9	3,258.6
12. Barley, bushels	119,568*	1,032,024	763.1	97.6	314.9
13. Rye, bushels	121,411	78,088	—35.7	99.09	23.8
14. Buckwheat, bushels	28,052	52,438	86.9	22.9	16.0
15. Total small grains, bushels	4,632,006	30,706,884	562.9	3,780.3	9,370.7
16. Corn, bushels	2,941,952	4,743,117	61.2	2,401.0	1,447.4
17. Peas and beans, bushels	18,988	46,601	145.4	15.5	14.2
18. Irish potatoes, bushels	2,516,485*	1,943,063	—22.8	2,053.7	593.0
19. Sweet potatoes, bushels	792	1,594	101.3	.65	.49
20. Flaxseed, bushels	118	18,635	15,692.4	.1	5.7
21. Clover seed, bushels	351*	126	—64.1	.29	.03
22. Grass seed, bushels	3,255*	3,045	—6.5	2.1	.93
23. Total, bushel crops, bushels	10,113,947	37,463,065	270.4	8,254.3	11,432.5

*Corrected total to agree with the county items in the census.

Items	1860	1870	Percentage of increase or decrease	Per 100 of country population	
				1860	1870
			%		
24. Hay, tons	269,483*	695,053	157.9	219.9	212.1
25. Rice, pounds	3,286	None	....	2.7	....
26. Tobacco, pounds	38,938	8,247	—78.8	31.8	2.5
27. Hops, pounds	140*	222,065	158,517.9	.11	67.8
28. Hemp, tons	109	None	....	.09	....
29. Flax, pounds	1,983	122,571	6,081.1	1.6	37.4
30. Silk cocoons, pounds	52	None	....	.04	....
31. Maple sugar, pounds	370,669	210,467	—43.2	302.5	64.2
32. Maple syrup, gallons	23,038	12,722	—44.8	18.8	3.9
33. Sorghum syrup, gallons	14,178	38,735	173.1	11.6	11.8
34. Wine, gallons	412	1,750	324.8	.34	.53
35. Orchard products, value	$649	$15,818	2,337.3	$0.53	$4.83
36. Market-garden products, value	$94,704*	$115,234	21.7	$77.29	$35.17
37. Forest products of farms, value	(No report)	$311,528	....	....	$95.06
IV. Live Stock on Farms:					
38. Horses	17,065	93,011	445.0	13.9	28.4
39. Mules and asses	377	2,350	523.9	.31	.72
40. Milch cows	40,444*	121,467	200.3	33.0	37.1
41. Working oxen	27,568	43,176	56.6	22.5	13.2
42. Other cattle	51,345	145,736	183.8	41.9	44.5
43. Sheep	13,044	132,343	914.6	10.6	40.4
44. Swine	101,371	148,473	46.5	82.7	45.3
45. Total live stock	251,214	686,556	173.3	205.0	209.5
V. Animal Products:					
46. Wool, pounds	20,388	401,185	1,867.8	1.7	122.4
47. Butter, pounds	2,957,673	9,522,010	221.9	2,413.8	2,905.8
48. Cheese, pounds	199,314	233,977	17.4	162.7	71.1
49. Milk sold, gallons	(No report)	208,130	....	....	63.5
50. Beeswax, pounds	1,544	3,963	156.7	1.3	1.2
51. Honey, pounds	33,585*	92,606	175.7	27.4	28.3
52. Animals slaughtered or sold for slaughter, value	$751,544	$3,076,650	309.4	$613.36	$938.89
VI. Value of:					
53. Farms	$27,505,922	$97,847,442	255.7	$22,448.32	$29,859.78
54. Live stock	$3,642,841	$20,118,841	452.3	$2,973.02	$6,139.60
55. Implements and machinery	$1,018,183	$6,721,120	560.1	$830.97	$2,051.06
56. Wages paid	(No report)	$4,459,201	....	....	$1,360.80
57. Farm products (including betterments and additions to stock)	(No report)	$33,446,400	....	....	$10,206.72

COMPARISON OF CURRENCY AND GOLD VALUES

Figures in italics indicate results if values in 1870 are reduced 20% to allow for depreciation of currency at that date. (See Census 1910, Supp. for Minn., p. 365.)

Items‡	1860	1870	Percentage of increase or decrease	Per 100 of country population	
				1860	1870
			%		
35a. Orchard products, value	$649	$15,818 *$12,654*	2,337.3 *1,849.8*	$0.53	$4.83 *$3.86*
36a. Market-garden products, value	$94,704*	$115,234 *$92,187*	21.7 *—2.7*	$77.29	$35.17 *$28.14*

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*Corrected total to agree with the county items in the census.

‡Numbers refer to position of the same items in the preceding table, (a) being added.

Items‡	1860	1870	Percentage of increase or decrease	Per 100 of country population	
				1860	1870
			%		
37a. Forest products of farms, value....	(No report)	$311,528	.. ..	....	$95.06
		$249,222			*$76.05*
52a. Animals slaughtered or sold for slaughter, value..............	$751,544	$3,076,650	309.4	$613.36	$938.89
		$2,461,320	*227.5*		*$751.11*
Value of:					
53a. Farms..........................	$27,505,922	$97,847,442	255.7	$22,448.32	$29,859.78
		$78,277,954	*184.6*		*$23,887.82*
54a. Live stock......................	$3,642,841	$20,118,841	452.3	$2,973.02	$6,139.60
		$16,095,073	*341.8*		*$4,911.68*
55a. Implements and machinery........	$1,018,183	$6,721,120	560.1	$830.97	$2,051.06
		$5,376,895	*428.1*		*$1,640.85*
56a. Wages paid......................	(No report)	$4,459,201	....	....	$1,360.80
		$3,567,361			*$1,088.64*
57a. Farm products including betterments and additions to stock....	(No report)	$33,446,400	....	....	$10,206.72
		$26,757,120			*$8,165.38*

‡Numbers refer to position of the same items in the preceding table with (a) added.

TABLE 10.—PROGRESS OF AGRICULTURE, 1870-1880. (ANALYSIS FROM THE FEDERAL CENSUS)

Items	1870	1880	Percentage of increase or decrease (a minus sign denotes a decrease)	Per 100 of the country population	
				1870	1880
I. Population:			%		
1. Country population................	327,698	543,193	65.8	....	....
2. Town population...................	112,008	237,580	112.1	....	....
3. Total population..................	439,706	780,773	77.6	....	....
II. Acreage:					
4. Improved land in farms, acres......	2,322,102	7,246,693	212.1	708.63	1,334.09
5. Permanent pastures, meadows, orchards, vineyards, acres.......	(No report)	1,727,325	....	....	317.99
6. Tilled land, including fallows and grass in rotation, acres..........	(No report)	5,519,368	....	....	1,016.09
7. Unimproved land in farms, acres....	4,161,726	6,156,326	47.9	1,270.0	1,133.36
8. Woodland, acres...................	1,336,299	2,030,726	52.0	407.8	373.85
9. Total land in farms, acres..........	6,483,828	13,403,019	106.7	1,978.0	2,467.45
10. Number of farms..................	46,500	92,386	98.7	14.2	17.01
11. Average size of farms, acres.........	139.4	145.1	4.1	....	....
12. Average improved land per farm, acres..........................	49.9	78.4	57.1	....	....
III. Farm Products:					
13. Wheat, acres.....................	(No report)	3,044,670	....	....	560.5
14. Wheat, bushels...................	18,866,073	34,601,030	83.4	5,757.3	6,369.9
15. Oats, acres......................	(No report)	617,469	....	....	113.7
16. Oats, bushels....................	10,678,261	23,382,158	119.0	3,258.6	4,304.6
17. Barley, acres....................	(No report)	116,020	....	....	21.4
18. Barley, bushels..................	1,032,024	2,972,965	188.1	314.9	547.3
19. Rye, acres.......................	(No report)	13,614	....	....	2.5
20. Rye, bushels.....................	78,088	215,245	175.6	23.8	39.6
21. Buckwheat, acres.................	(No report)	3,677	....	....	.67
22. Buckwheat, bushels...............	52,438	41,756	—20.4	16.0	7.70
23. Total, small grains, acres...........	(No report)	3,795,450	....	....	698.70
24. Total, small grains, bushels.........	30,706,884	61,213,154	99.3	9,370.7	11,269.10

Items	1870	1880	Percentage of increase or decrease	Per 100 of the country population	
				1870	1880
25. Corn, acres	(No report)	438,737	....	....	80.8
26. Corn, bushels	4,743,117	14,831,741	212.7	1,447.4	2,730.5
27. Peas and beans, bushels	46,601	25,039	—46.3	14.2	4.6
28. Irish potatoes, bushels	1,943,063	5,184,676	166.8	593.0	954.5
29. Sweet potatoes, bushels	1,594	None	....	.49	....
30. Flaxseed, bushels	18,635	98,689	429.6	5.7	18.2
31. Clover seed, bushels	126	18,003	14,188.2	.03	3.3
32. Grass seed, bushels	3,045	30,707	908.5	.93	5.7
33. Total, bushel crops, bushel	37,463,065	81,402,009	117.3	11,432.5	14,985.8
34. Hay,* acres	(No report)	1,053,378	....	....	193.9
35. Hay, tons	695,053	1,637,109	135.5	212.1	301.4
36. Tobacco, acres	(No report)	163	....	....	.03
37. Tobacco, pounds	8,247	69,922	747.8	2.5	12.9
38. Hops, acres	(No report)	30	....	....	.006
39. Hops, pounds	222,065	10,928	—95.1	67.8	2.0
40. Hemp, tons	None	20	....	....	.004
41. Flax fiber, pounds	122,571	497	—99.6	37.4	.09
42. Broom corn, pounds	(No report)	68,433	....	....	12.6
43. Maple sugar, pounds	210,467	76,972	—63.4	64.2	14.2
44. Maple syrup, gallons	12,722	11,407	—10.3	3.9	2.1
45. Sorghum syrup, gallons	38,735	543,369	1,302.8	11.8	100.0
46. Sorghum sugar, pounds	(No report)	190	....	....	.035
47. Wine, gallons	1,750	(No report)	....	.53	....
48. Orchard products, value	$15,818	$121,648	669.0	$4.83	$22.39
49. Market-garden products, value	$115,234	$166,030	44.1	$35.17	$30.57
50. Forest products, value	$311,528	$1,796,260	476.6	$95.06	$330.68
IV. Live stock on farms:					
51. Horses	93,011	257,282	176.6	28.4	47.3
52. Mules and asses	2,350	9,019	283.8	.72	1.7
53. Milch cows	121,467	275,545	126.8	37.1	50.7
54. Working oxen	43,176	36,344	—15.8	13.2	6.7
55. Other cattle	145,736	347,161	138.2	44.5	63.9
56. Sheep	132,343	267,598†	102.2	40.4	49.3
57. Swine	148,473	381,415	156.9	45.3	70.2
58. Total live stock	686,556	1,574,364	129.3	209.5	289.8
V. Animal products:					
59. Wool, pounds	401,185	1,352,124§	237.0	122.4	248.9
60. Butter made on farms, pounds	9,522,010	19,161,385	101.2	2,905.8	3,527.5
61. Butter made in factories	(No report)	83,450	....	....	15.4
62. Total butter, pounds	9,522,010	19,245,835	102.2	2,905.7	3,543.1
63. Cheese made on farms, pounds	233,977	523,138	123.6	71.1	96.3
64. Cheese made in factories	37,500	462,191	1,132.5	11.5	85.1
65. Total cheese, pounds	271,477	985,329	263.0	82.8	181.4
66. Milk sold, gallons	208,130	1,504,407	622.8	63.5	276.9
67. Beeswax, pounds	3,963	6,552	65.3	1.2	1.2
68. Honey, pounds	92,606	234,054	152.7	28.3	43.1
69. Animals slaughtered or sold for slaughter, value	$3,076,650	(No report)	....	$938.89	....

*Includes wild and cultivated hay.
†Sheep exclusive of spring lambs.
§Spring clip of 1880.

Items	1870	1880	Percentage of increase or decrease	Per 100 of the country population	
				1870	1880
VI. Value of:					
70. Farms, including fences and buildings	$97,847,442	$193,724,260	98.0	$29,859.78	$35,663.98
71. Live stock	$20,118,841	$31,904,821	58.6	$6,139.60	$6,873.58
72. Implements and machinery	$6,721,120	$13,089,783	94.8	$2,051.06	$2,409.78
73. Wages paid	$4,459,201	(No report)	....	$1,360.80	....
74. Cost of building and repairing fences	(No report)	$1,316,895	....	....	$242.43
75. Cost of fertilizers purchased	(No report)	$93,250	....	....	$17.17
76. Farm products	$33,446,400	$49,468,951	47.9	$10,206.72	$9,107.07

COMPARISON OF CURRENCY AND GOLD VALUES

Figures in italics indicate results if values in 1870 are reduced 20% to allow for depreciation of currency at that date. (See Census 1910, Supp. for Minn., p. 365.)

Items*	1870	1880	Percentage of increase or decrease	Per 100 of the country population	
				1870	1880
48a. Orchard products, value of	$15,818	$121,648	669.0	$4.83	$22.39
	$12,654		*861.3*	*$3.86*	
49a. Market-garden products, value of	$115,234	$166,030	44.1	$35.17	$30.57
	$92,187		*80.1*	*$28.14*	
50a. Forest products, value of	$311,528	$1,796,260	476.6	$95.06	$330.68
	$249,222		*620.8*	*$76.05*	
69a. Animals slaughtered or sold for slaughter, value of	$3,076,650	(No report)	....	$938.89	....
	$2,461,320			*$751.11*	
VI. Value of:					
70a. Farms, including fences and buildings	$97,847,442	$193,724,260	98.0	$29,859.78	$35,663.98
	$78,277,954		*147.5*	*$23,887.82*	
71a. Live stock	$20,118,841	$31,904,821	58.6	$6,139.60	$6,873.58
	$16,095,073		*98.2*	*$4,911.68*	
72a. Implements and machinery	$6,721,120	$13,089,783	94.8	$2,051.06	$2,409.78
	$5,376,895		*143.4*	*$1,640.85*	
73a. Wages paid	$4,459,201	(No report)	....	$1,360.80	....
	$3,567,361			*$1,088.64*	
76a. Farm products	$33,446,400	$49,468,951	47.9	$10,206.72	$9,107.07
	$26,757,120		*87.1*	*$8,165.38*	

*Numbers refer to position of the same items in the preceding table, (a) being added.

CHAPTER V

DEVELOPMENT OF DIVERSIFIED FARMING, 1880-1900

The rush to the cities, and the milling industry

The lessened profits in agriculture and the increased profit in milling tended at once to increase the urban population and to cause a rapid development of the milling industry. These causes, combined with discriminations in railroad rates in favor of competitive points, resulted in a startling increase in the population of large urban centers during the decade 1880-1890. As a result, the population of Minneapolis (including St. Anthony) rose from 5,821 in 1860 to 18,079 in 1870, 46,887 in 1880, 129,200 according to the state census of 1885, and 164,738 in 1890. During the fifteen years after 1870, following the introduction of the middlings purifier, there was thus more than a seven-fold increase in the population of Minneapolis. During the same period the population of the State had risen from 439,706 in 1870 to 1,117,798 in 1885, less than a three-fold increase (Table XI).

TABLE XI.—Development of Flour Milling in Minnesota, 1860-1890 (Based on the U. S. Census)

Items	Census of 1860	Census of 1870	Amount of Increase	Percentage of Increase
Number gristmills	81	216	135	167.0
Capital invested	$587,500	$2,900,915	$2,313,415	393.8
Cost of raw materials	$978,552	$6,090,006	$5,111,454	522.3
Hands employed	188	790	602	302.3
Value of product	$1,289,665	$7,534,575	$6,244,910	484.2

Items	Census of 1870	Census of 1880	Amount of Increase	Percentage of Increase
Number gristmills	216	436	220	101.8
Capital invested	$2,900,915	$10,510,362	$7,609,447	262.3
Cost of raw materials	$6,090,006	$37,155,429	$31,065,423	510.1
Hands employed	790	2,634	1,844	233.5
Value of product	$7,534,575	$41,519,004	$33,984,429	451.0

Items	Census of 1880	Census of 1890	Amount of Increase or Decrease	Percentage of Increase or Decrease
Number gristmills	436	307	—129	—29.6
Capital invested	$10,510,362	$19,518,743	$9,008,381	85.7
Cost of raw materials	$37,155,429	$52,383,867	$15,228,438	41.0
Hands employed	2,634	4,038	1,404	53.3
Value of product	$41,519,004	$60,158,088	$18,639,084	44.9

As shown by the preceding table, the milling industry in the meantime underwent a corresponding, if somewhat less rapid, expansion. In 1870 the value of flour mill products in the State had been 7.5 million dollars; in 1880 it was 41.5 millions, nearly a six-fold increase; in 1890 it was 60.2 millions (Fig. 99). In Minneapolis the output of flour, though fluctuating from year to year, on the whole kept pace with the increase of value for the State, which was in fact largely based upon the product of the Minneapolis mills. Beginning about 1877 there was also an important direct export movement to Europe, especially from Minneapolis. Exportation, however, did not keep pace with production, owing to the increasing proportion needed to supply the American market, and also because of competition from eastern milling centers.

Weather conditions, 1880-1890

The period 1880-1890 had on the whole more favorable weather conditions than either the preceding or the following decade (Figs. 69, 70, 100, 101). In 1881, however, the summer was the warmest since 1868, while the rainfall during that season remained below normal. Later in the fall, indeed, there were heavy rains but they came too late for any of the small grains.

Average crop yields, 1880-1890

The average yield of wheat per acre in 1880 was 13.3 bushels, which was better than in any year since 1877 (Figs. 71, 102), though far inferior to the yields of many earlier years. In 1881 it fell almost to the level of 1879, owing to the very dry summer. In 1882 again it averaged a trifle higher (Figs. 100, 102). Thereafter, for the remainder of the decade, the average yield of wheat per acre exceeded 13 bushels in every year but 1887, the best crops being in 1884 (16.23 bushels) and 1889 (15.3 bushels). During these years, nevertheless, the wheat fields were damaged by rust and insect attacks, especially in the older counties. One of the worst years was that of 1887, when 15 important counties were devasted by chinch-bugs, while a fresh incursion of locusts was in progress in Otter Tail County.[3]

Corn suffered from the backward spring and early frosts in 1882 and 1883, with the result that barley was largely fed to stock in lieu of corn the following winter. This experience shook the faith of many farmers in corn as a reliable crop and for a time checked the development of corn growing in the State[4] (Figs. 102, 104).

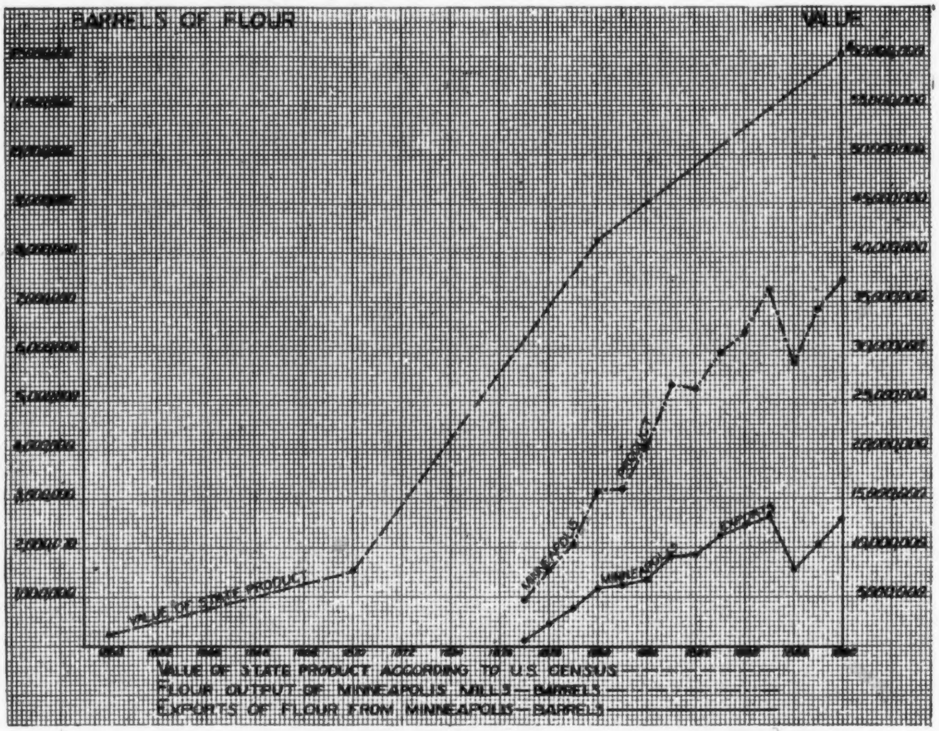

Figure 99. Development of flour milling, 1860-1890.[1]

Price fluctuations, 1880-1890

The abrupt drop in the price of wheat in 1878 and 1879, following the equally abrupt rise of 1877, was succeeded by a period of higher prices which culminated in 1882. This rise was in turn followed by a still greater decline which carried the average prices for the period 1884-1887, following the industrial depression of 1883-1884, to the lowest level since 1863 (Figs. 53, 75). Contemporary writers attributed this break in prices to the competition of Russian wheat in European markets.[5] Many of the farmers, however, attributed the fall to market manipulation and became bitter in their opposition to the system of state statistics, which they considered a device to aid the speculators. This opposition, which increased from year to year, diminished somewhat the reliability of the state statistics as to the acreage under tillage.[6]

After the poor crop of 1887 there was another period of higher prices, continuing during the remainder of the decade and reaching its culmination in 1891, shortly before the great depression and panic of 1893.

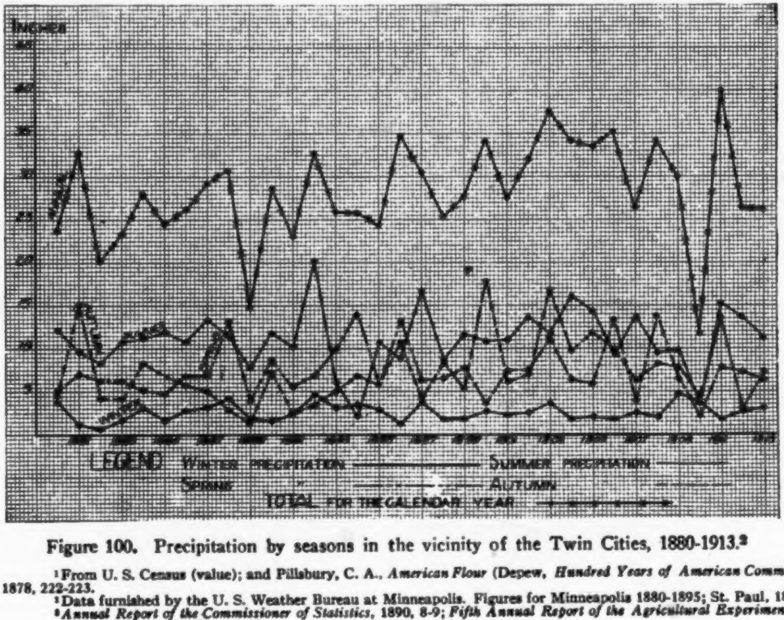

Figure 100. Precipitation by seasons in the vicinity of the Twin Cities, 1880-1913.[2]

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[1] From U. S. Census (value); and Pillsbury, C. A., *American Flour* (Depew, *Hundred Years of American Commerce*, I, 269-273); *Statistics of Minnesota*, 1871, 157; 1876, 204-206; 1878, 222-223.

[2] Data furnished by the U. S. Weather Bureau at Minneapolis. Figures for Minneapolis 1880-1895; St. Paul, 1896-1904; Minneapolis, 1905-1913.

[3] *Annual Report of the Commissioner of Statistics*, 1890, 8-9; *Fifth Annual Report of the Agricultural Experiment Station*, 96-99.

[4] *Ibid.*, 1893, 15-16; 1884, 16-17.

[5] *Ibid.*, 1884, 11; 1889, 7-8.

[6] *Ibid.*, 1884, 9-10.

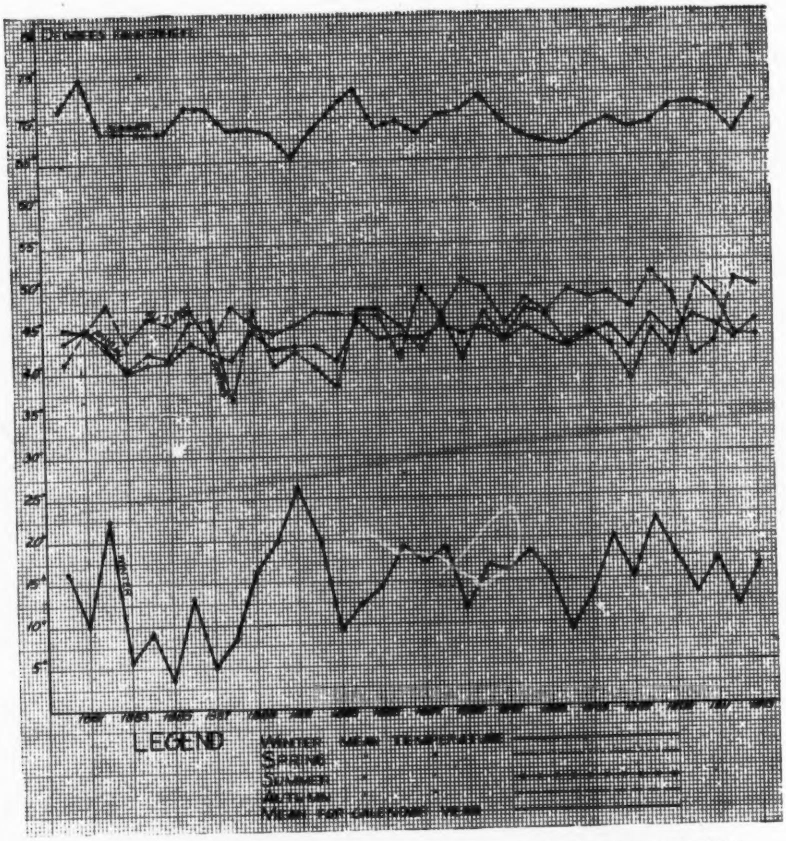

Figure 101. Temperature by seasons in vicinity of the Twin Cities, 1880-1913.[2]

Areas in crops, 1880-1890

The total land under tillage increased during the decade from 4.4 million acres in 1880 to 5.9 millions in 1889, a gain of 1.5 millions or 34.9 per cent. Most of the years showed an increase in acres tilled over the preceding year, the notable exceptions being 1882, which followed the crop failure of 1881, and 1887, which came after three years of abnormally low prices[7] (Figs. 102, 75).

The land under wheat, on the other hand, fell off over 225 thousand acres during the ten years.

The discouragingly small yields of 1880 and 1881 caused a loss of acreage the following years in spite of rising prices. This decline was largely localized in the older counties.[8] In 1883 more wheat was sown because of the slightly better yield and higher prices in 1882. There continued to be a larger acreage in wheat, with some fluctuations, from 1883 to 1887 during the period of low prices, owing to the relatively good yields; but the poor crop of 1887, coinciding with the bottom price reached in that year, again reduced the acreage planted to wheat during the remaining years of the decade.

A stationary or falling acreage devoted to wheat, while the tilled area was increasing 34.9 per cent, of course meant a decline in the proportion of tilled land occupied by that crop.

From 68.98 per cent in 1878, the highest point ever reached, the percentage of land in wheat declined to 66.59 in 1880, 53.35 in 1882, and (after the slight rally in 1883-84 previously mentioned) to 45.89 per cent in 1889.[9] This was a smaller proportion than at any time during the preceding thirty years. Most of the land lost by wheat went to the other cereals, chiefly oats, corn, and barley. The percentage of tilled land in cereals nevertheless did decline from 94.47 in 1879 to 86.27 in 1889—a loss of 8.20 per cent. Nearly all of this (7.15 per cent) was planted to flaxseed and cultivated hay. Potatoes had sold so low, prior to about 1880, as hardly to pay the cost of digging and hauling to market, to say nothing of cultivation. About that time, however, the supply became inadequate for the growing city population and prices consequently advanced, though still subject to great fluctuations. As a result, potatoes doubled their acreage from 1880 to 1889, which meant an increase in percentage of

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[7] *Ibid.*, 1889, 18.

[8] *Ibid.*, 1883, 14.

[9] *Annual Report Commissioner of Statistics*, 1890, 9. The census of 1890 gives no totals for all tilled land. However, by footing the acres assigned to different crops in the census and also adding in the acreage assigned to certain minor crops in the state statistics, for which the census gives no acreage, a base is obtained from which a calculation of percentage relations is possible. Such a calculation gives 46.89 as the percentage of tilled land in wheat at the census of 1890. In view of the many chances of error in a composite problem, such a close approximation of the result to the figure given in the state statistics is reassuring as to the substantial accuracy of both the state and the census figures. It is quite possible, too, that the larger percentage of land in wheat shown by the census was due to the fact that, being taken as of June 1, 1890, the crops reported were necessarily those of the 1889 crop season, while the acreages were likely in many cases to be those of the 1890 season; and in that year, as indicated by the state statistics, there was again an increase in the percentage of land sown to wheat.

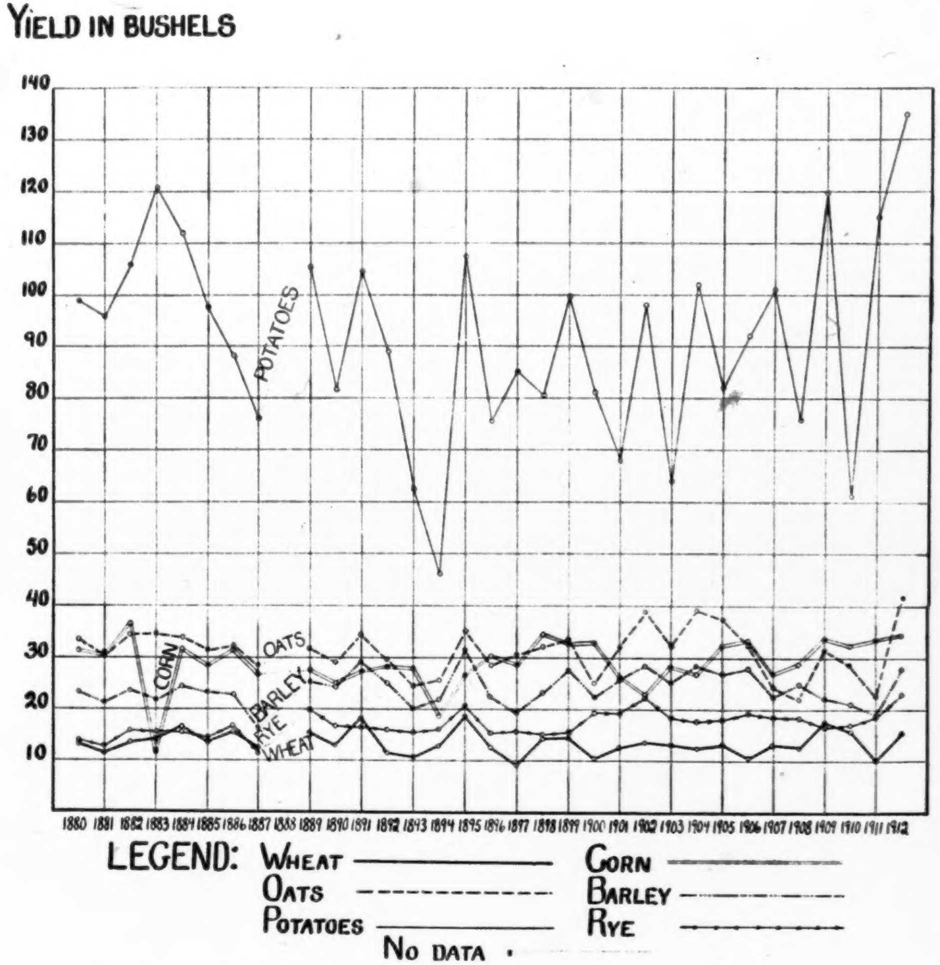

Figure 102. Average crop yields, in bushels, 1880-1912.[10]

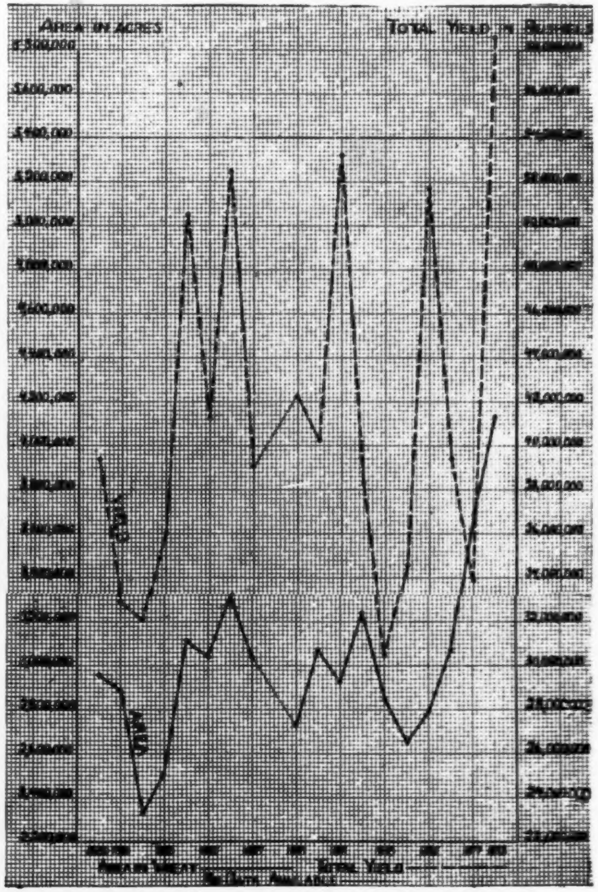

Figure 103. Total acreage and production of wheat, 1880-1898.[11] For the year 1888 no record of the acreage or production is available.

[10] Data for years 1880-89, from *Annual Report of the Commissioner of Statistics*, 1889, 19; for years 1890-95, *Ibid*, 1895 and 1896, 8; for years 1896-1912, *Yearbook of the Department of Agriculture*.
[11] *Ibid*., 1894, 10; 1896, 6; 1898, 50.

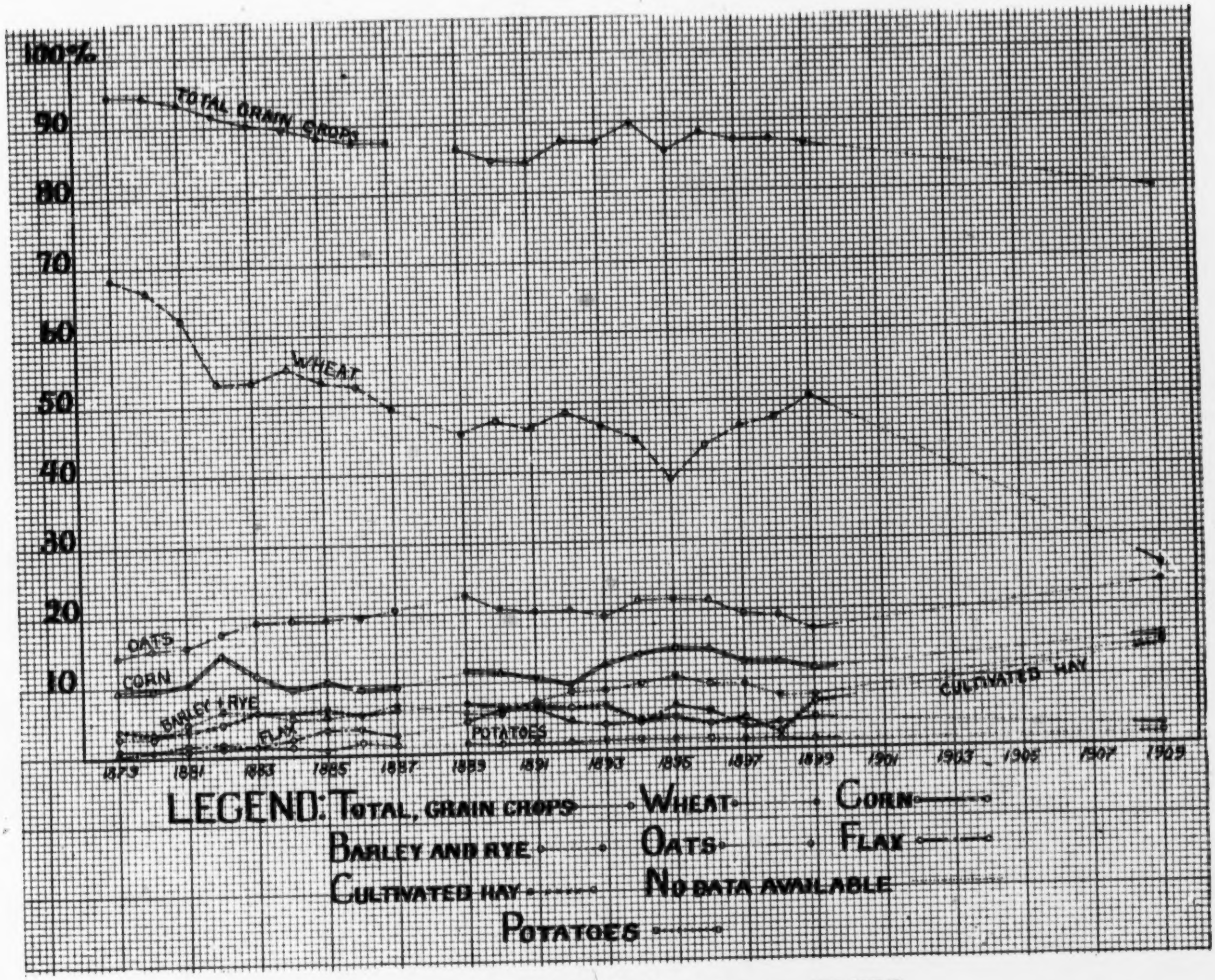

Figure 104. Percentage of tilled land in principal crops, 1880-1909.[12]

tilled land occupied by this crop from 0.86 to 1.29. More attention was also paid to good varieties for planting.[13] About 1886 a specialized potato district began to develop in the counties just north of St. Paul and Minneapolis, the direct stimulus being furnished by a produce firm which sent buyers through the country. In 1886 the shipments were only 150 cars; but by 1889 over 1,000 cars were shipped to New England alone, in competition with the Maine product. Starch factories were also established to use the small and unsalable potatoes.[14]

Animal industries, 1880-1890

Additional attention began to be paid to better breeds of stock during this period including, among others, blooded horses.[15] Sheep also increased somewhat, though less rapidly than other live stock, owing to the loss from dogs.[16] The principal gain, however, was in hogs, which increased from 381,415 to 853,715 (Table XXVII), and in cattle, which increased from 659,050 to 1,373,579. The percentage of cattle represented by dairy cows also rose from 41.8 in 1880 to 43.2 in 1890 (Table XXIV). This gain, both in cattle and in hogs, was the result of the development of the dairy industry, which not only supplied by-product cattle for the market but also furnished waste materials for feeding by-product hogs. This development began in earnest during 1881, according to the testimony of the state agent of the Federal Department of Agriculture, as a consequence of the conditions previously discussed which tended to reduce the area planted to wheat. So rapid was the change that by the close of 1882 the dairy industry had advanced from relatively small beginnings to a position of real importance. That year also marked the organization of a new association representing the butter and cheese factory interests,[17] as distinguished from dairy farming,

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[12] Years 1879 to 1898 inclusive from *Annual Report Commissioner of Statistics*, 1891, 9; 1898, 52. Years 1899 and 1909 from census. For 1888 and 1900-1908 inclusive no report was made.

[13] *Ibid.*, 1889, 20; 1890, 8-9.

[14] *Ibid.*, 1889, 206-207.

[15] *Ibid.*, 1890, 131.

[16] *Ibid.*, 1883, 33-34.

[17] *Report of First Annual Meeting of Minnesota Butter and Cheese Association*, 1882.

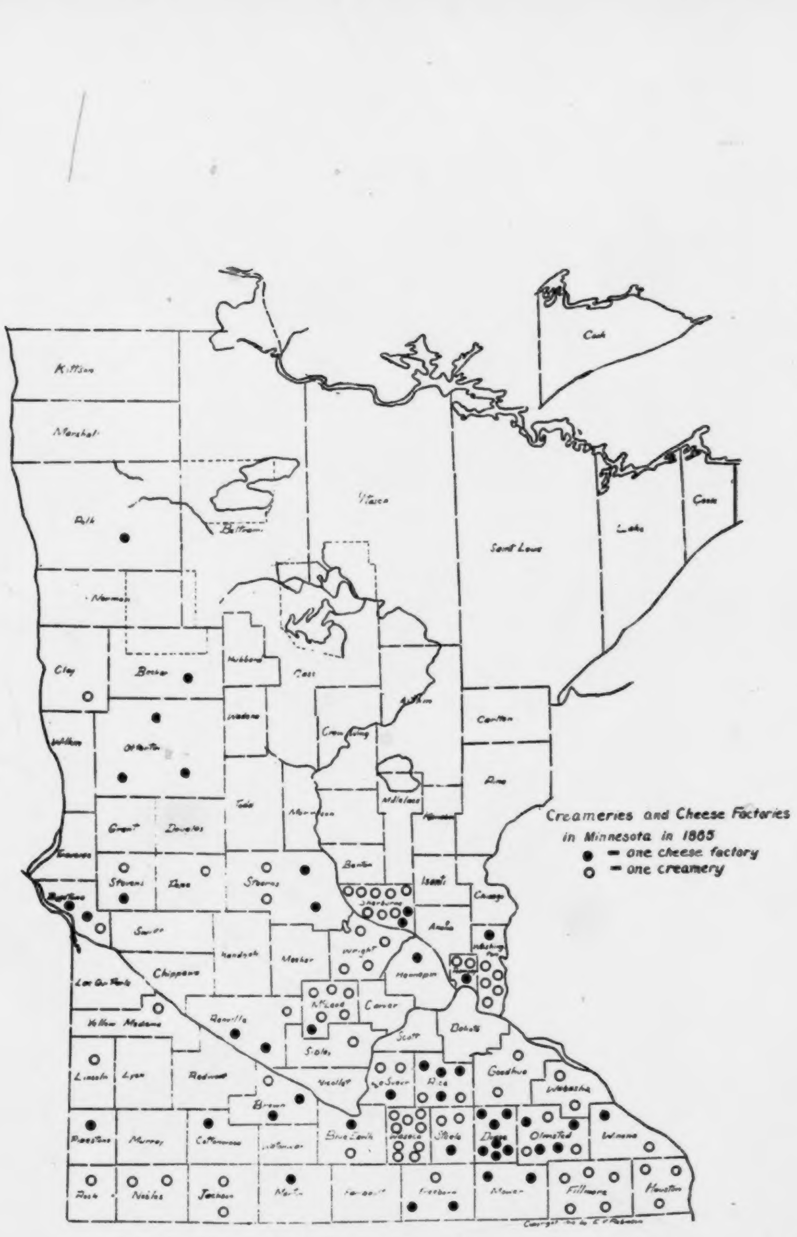
Creameries and Cheese Factories
in Minnesota in 1885
● = one cheese factory
○ = one creamery

Figure 105. Distribution of creameries and cheese factories in 1885.[18]

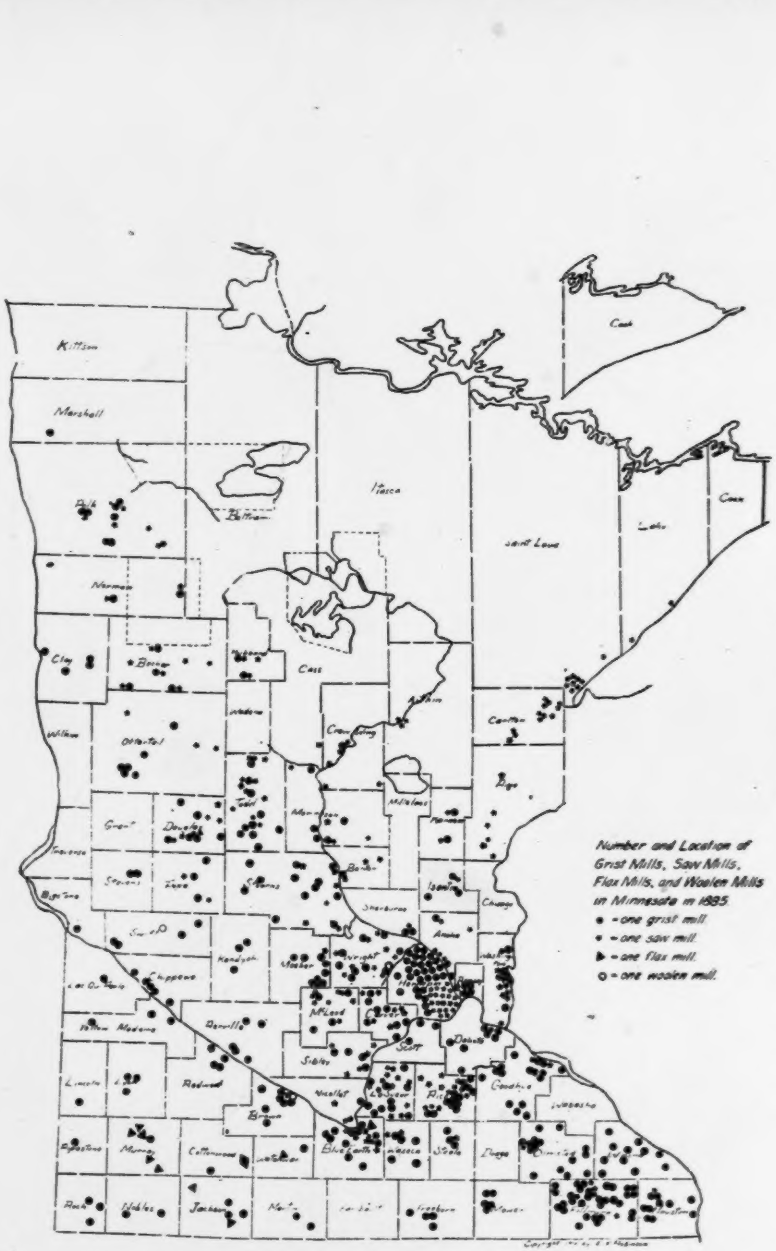
Number and Location of
Grist Mills, Saw Mills,
Flax Mills, and Woolen Mills
in Minnesota in 1885
● = one grist mill
• = one saw mill
▶ = one flax mill
○ = one woolen mill

Figure 106. Number and location of gristmills, sawmills, flax mills, and woolen mills in 1885.[19]

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[18] Exclusive of "estimates" added by Commissioner of Statistics. See *Ibid.*, 1885, 83-85.
[19] *Ibid.*, 1885, 313-320.

which was represented in the State Dairymen's Association. Shortly afterward, in 1885, the interest in progressive agriculture also led to the establishment of the School of Agriculture in connection with the University of Minnesota, and the creation of the office of State Dairy Commissioner. Again, in 1887, came the establishment of the Agricultural Experiment Station in connection with the Department of Agriculture at the University. All of these have been important factors in subsequent agricultural development.

The first creameries in the State dated from about 1876 (p. 81); at the census of 1880 only 83,450 pounds of butter out of 19,244,835 pounds were reported as the product of butter factories.[20] By 1883, on the other hand, there were already 63 creameries in the State and their improved methods, together with the better grade of dairy cattle, had wrought a revolution in market conditions. The best brands of Minnesota creamery butter then began to rank with the best in eastern markets, and won premiums at the New Orleans Exposition.[21] Cheese, on the other hand, losing the exclusive advantage of factory methods, declined in relative importance. In 1885 the state statistics showed 73 creameries against 46 cheese factories.[20] The distribution of these by counties (but not by towns) is shown in Fig. 105.

Comparing this map with the one of cheese factories in 1880 (Figs. 105, 79), it appears that while the creameries had in some instances taken the place of cheese factories, they were mostly a clear addition.

There was, however, such variation from year to year in the number of creameries and cheese factories shown in the state statistics as to suggest that the same establishment was sometimes operated as a cheese and again as a butter factory, especially as the cheese season extended only from May 1 to November 1.[22] Whenever the price of butter exceeded two and one-half times the price of cheese, there was a tendency to make more butter; and, conversely, whenever the price of cheese per pound exceeded 40 per cent of the price of butter,[23] there was a prospect of greater profit in cheese; limited, however, by the loss of the skim milk, and the fact that high-grade butter was easier to make than high-grade cheese.[22] Finally, the factory organization of the dairy industry was still in an experimental stage, many of the plants failing because too small for profitable operation; and fire losses became so great that some companies refused to write insurance upon such property.[22]

The development of the dairy industry was also for a time somewhat retarded by the competition of oleomargarine, and filled cheese, not only in the eastern markets but even within the State. In 1884 as much as four million pounds of oleomargarine were shipped into Minnesota;[24] but in a few years these shipments had been reduced fully two thirds by congressional and state legislation, the latter enforced by the State Dairy Commissioner.[25] Cheese suffered less from this competition and during the later eighties the number of cheese factories in the State increased about a third each year under the stimulus of an active demand and high prices.[26]

Distribution of the population according to the census of 1890

In 1890 the area of maximum density of population covered the section south of St. Cloud and east of New Ulm (Figs. 107-108). Within this area, however, the density varied considerably, a number of counties in the lower Minnesota Valley showing a greater density, excluding towns above 2,500 population, than the older southeastern counties. Evidently the center of greatest density had moved toward the northwest. Beyond the limits named two municipalities of 2,500 population were found in the agricultural belt extending northwest from St. Cloud, and four in the northeastern section. The latter, however, were supported by industries other than agriculture.

The country population, outside of incorporated places, had overspread the entire prairie and hardwood zones, although still sparse in the southwest and in the Red River Valley (Fig. 108). The coniferous zone, on the other hand, was still a wilderness, the few people in the northeastern counties, outside the villages, being engaged in trapping, fishing, lumbering, and mining (Fig. 108).

Another phenomenon also first appeared during this decade—an actual decrease of country population in the older counties. During the previous decade, indeed, several scattering northern counties had declined somewhat, largely by reason of the shifting of lumbering in certain districts; but from 1880 to 1890 a solid group of thirteen counties, in the oldest and richest farming section, lost country population (Fig. 109). The decline was especially marked in the row of counties from Fillmore to Dakota inclusive, which for many years had led in the production of wheat; though the greatest percentage of loss (18.9) was in Hennepin. Most of this section was severely ravaged by the chinch-bug during this period; and it showed the most marked decline in wheat acreage (Figs. 131, 83, 110). Evidently an agricultural revolution was here in progress which disposed young men, not yet established in the world, to seek their fortunes elsewhere. Moreover, farmers who could not or would not adapt themselves to the new conditions were either selling out or being forced out by the pressure of debts which they could not pay. In either case, they were migrating westward, either to the new parts of Minnesota or to the Dakotas, and were taking up fresh lands, there to continue the only type of agriculture which they knew how to practice. On the other hand, those who remained and adopted a more scientific method of farming soon found this change reflected in the value of their land. It should be added that the striking decline in country population in Hennepin County was due to the incorporation as villages of certain suburban districts and the addition of others to the city. The same thing was true in Ramsey. In the other eleven counties minor variations were due to this cause; but a careful scrutiny shows that the decrease was general, appearing in many of the townships, irrespective of incorporations and urban additions. No rate of change during the decade could be ascertained for Norman County, since it was formed in 1881, nor for Hubbard County, organized in 1883.

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[20] *Statistics of Minnesota*, 1877, 55; 1878, 39, 40; 1880, 38.

[21] *Ann. Rept. Comr. of Statistics*, 1883, 10, 30; 1884, 335.

[22] *Ibid.*, 1894, 84-86.

[23] The ratio, then accepted between the amount of milk necessary for the two purposes respectively in contrast to the earlier ratio of 2.34 (page 81). (*Ibid.*, 1894, 85).

[24] *First Biennial Report of Minnesota Dairy Commissioner*, 1887, 6-42. Census report 1890, IX, pt. 3, 519.

[25] *Second Report, Minnesota Dairy Commissioner*, 1889, 21.

[26] *Ibid.*, 1889, 37.

Distribution of crops according to the census of 1890

The maps of wheat acreage and production (Figs. 110, 111) make it evident that the period of specialized wheat farming was at an end in southeastern Minnesota. The center of density of wheat growing then lay in the counties on either side of the big bend of the Minnesota, although the crop had extended throughout the Red River Valley.

Oats were grown throughout the agricultural portion of the State, largely for local use (Figs. 112, 113). In the southeastern counties, however, from Washington to Houston and Mower, oats were evidently being substituted for wheat as a market crop, since this is the region showing a marked decline in wheat (Figs. 83, 110).

Barley was peculiar in that it appeared mainly in the three corners of the State. The principal area of production, however, was in the southeastern counties, from Goodhue south and east. Here barley, like oats, served as a market crop in lieu of wheat (Figs. 114, 115).

Rye was planted mainly in the counties abutting on the Mississippi and lower Minnesota, from Sherburne and Wright to Winona, overlapping barley in the southern part of its range. Rye, like barley, was a substitute for wheat, since it grows well on soils naturally poor (Figs. 116, 117).

From the distribution of corn (Figs. 118, 119) it is evident that this grain, like oats, was in a measure following wheat in its migration north and west. As yet, however, most of the corn crop was found south of Sherburne and east of Brown counties, especially on the lowlands. On the other hand, the regions of greater elevation, such as the Coteau des Prairies in the southwest, and the plateau in Mower County, produced distinctly less corn (Figs. 118, 119). Compared to the competing small grains, corn has this advantage, that it does not require labor at the same time as wheat. For this reason the corn belt overlapped many of the wheat counties, notably Blue Earth.

Potatoes, like oats, were grown throughout the agricultural zone for local use, roughly in proportion to population. In addition, potatoes had become a leading market crop in the districts adjacent to the large cities. The potato belt also extended north through Isanti and Chisago counties, where much of the soil was too light for wheat, and the proximity of markets favored a bulky crop such as potatoes (Figs. 120, 122).

Flaxseed was still grown, most extensively in the prairie region of the southwest, where it had greatly extended its acreage since 1880 (Figs. 94, 121, 123). The southeastern counties from Mower and Fillmore to Dakota had also gone into flax growing to a considerable extent, as another partial substitute for wheat. Owing, however, to the exhausting effect of flax upon the soil, it could not continue to be so used for any great length of time upon the same fields.

The hay crop, including both wild and tame hay, was distributed more nearly in proportion to the population than any other product (Fig. 124). Tame hay, on the other hand, was grown chiefly in the districts which were turning to dairying as their main resource. A glance at the map of acreage shows that these districts were south of Washington and Hennepin and east of Blue Earth counties (Figs. 125, 126).

Distribution of dairy industry in 1890

Dairy cows were distributed in the several counties in much the same ratio as the cut of hay. They were, however, relatively more numerous in the same districts as the largest acreage of tame hay. This concentration of the commercial dairy business is more apparent in the map of creameries and cheese factories, showing location by towns as well as counties (Figs. 126, 127).

Improved land and value of products in 1890

Improved land in farms formed from 60 to 80 per cent of the entire land area in all but six counties south of McLeod and east of Brown (Fig. 128); and in these six, which were all river counties with considerable areas of bluff and marsh except Freeborn, improved land amounted to from 40 to 60 per cent of the area. This southeastern district had made the most advance toward a full use of the land. The prairie counties farther west and northwest had, as a rule, from 20 to 40 per cent improved; only three had passed the 40 per cent line, while five still fell short of 20 per cent. East of the Mississippi only one county had 40 per cent, and two others as much as 20 per cent, of improved land.

The total value of farm products at the census of 1890 naturally corresponded in the main to the distribution of improved land. In Ramsey and Hennepin counties, however, the value was disproportionately high by reason of small areas devoted to market gardening and other intensive uses of the soil (Fig. 129).

Summary of development, 1880-1890

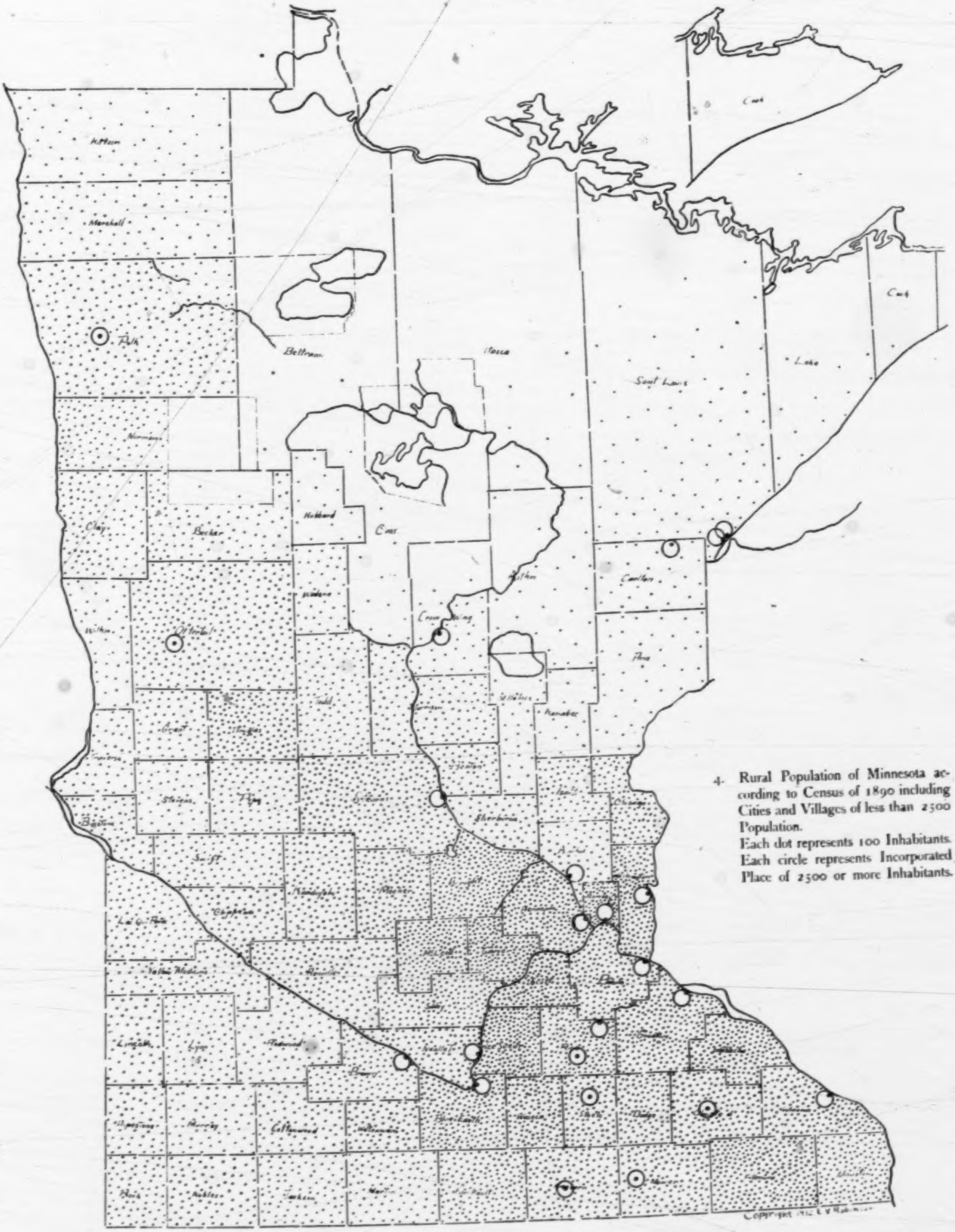
In order to bring out clearly the nature and extent of the changes in agriculture during the decade, Table 17 is presented at the end of this chapter showing the items reported by the census for 1880 and 1890, with a statement of the percentage of change and the relation to the country population.

During the ten years 1880-1890 the total population of the State rose from 780,773 to 1,310,283 or 67.8 per cent; the town population, from 237,580 to 602,169 or 153.5 per cent; the country population, on the other hand, from 543,193 to 709,114 or 30.4 per cent. In other words, for reasons previously indicated, town population increased more than five times as fast as country population.

The number of farms increased 26.9 per cent, the total area in farms 39.2 per cent, the improved land in farms 53.6 per cent; with the result that the average farm was greater by 14.6 acres and contained 16.8 acres more of improved land (Items 4-12). The tendency was thus toward a fuller use of the land, but not to the application of more labor to less land. On the contrary improved land in farms increased from 13.34 to 15.71 acres (or 17.8 per cent) per capita of the country population.

Wheat gained during the ten years only 10.8 per cent in acreage, but 51.2 per cent in yield. This difference was of course due to the better crop of 1889 compared to 1879 (Figs. 71, 102). Measured by country population, wheat culture actually declined, there being in 1890 only 4.8 acres in wheat per capita of such population, compared to 5.6 in 1880. All other grains, and in fact all other crops, gained rapidly by comparison with the country population, except several of little importance, such as hops, tobacco, hemp, and sorghum. Wheat, although still by far the leading crop, was thus in process of losing this preëminence (Items 13-63).

All kinds of live stock and poultry also increased faster than the country population, except mules and work oxen. Horses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Ottertail
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Grant
Douglas
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Stevens
Pope
Big Stone
Swift
Kanabec
Sherburne
Wright
Meeker
Kandiyohi
Chippewa
Lac Qui Parle
Yellow Medicine
Renville
Lincoln
Lyon
Redwood
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Rock
Nobles
Jackson
Martin
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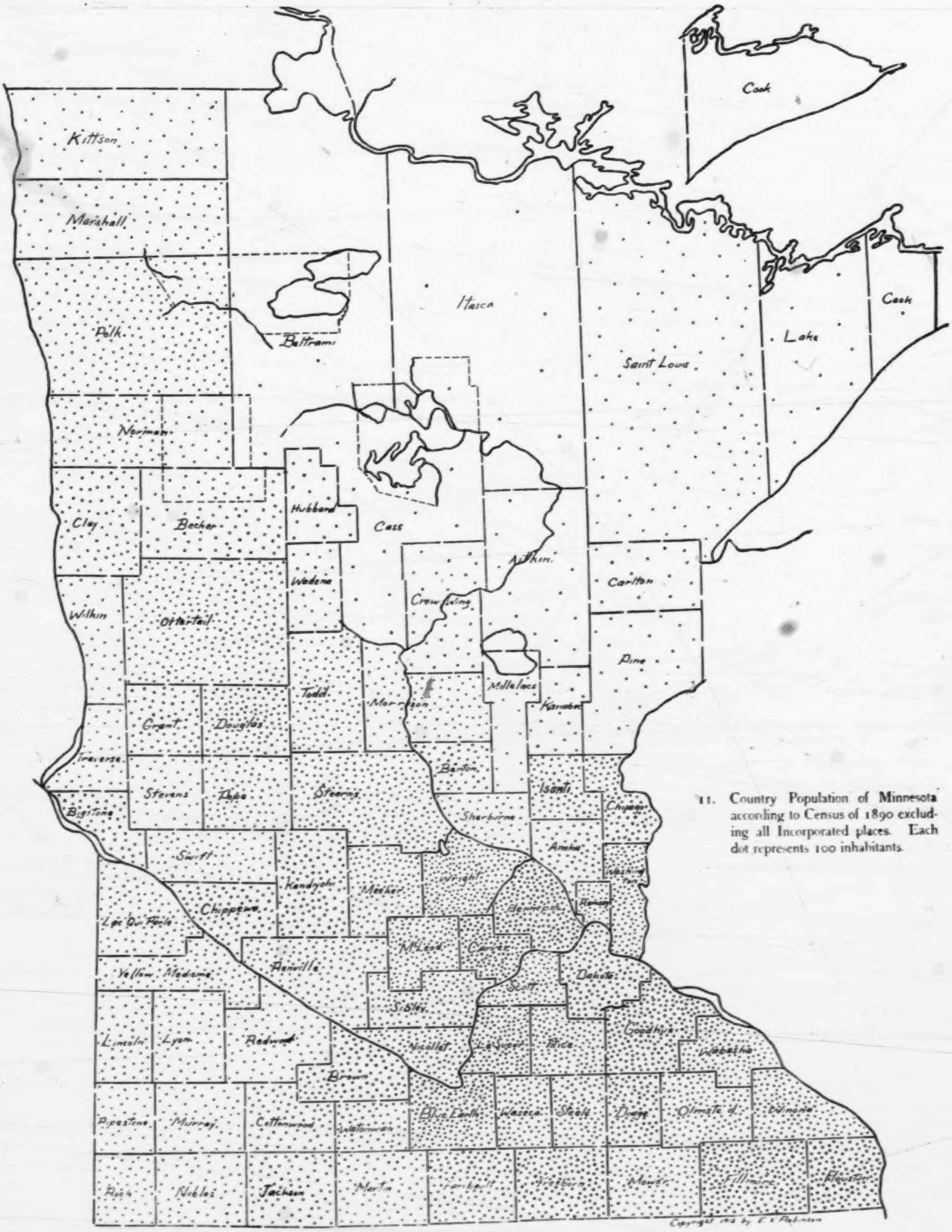
4. Rural Population of Minnesota according to Census of 1890 including Cities and Villages of less than 2500 Population.
Each dot represents 100 Inhabitants.
Each circle represents Incorporated Place of 2500 or more Inhabitants.

Figure 107. Population in 1890. (Based on Table XI)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Sibley
Goodhue
Lincoln
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Redwood
Nicollet
Le Sueur
Rice
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
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Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
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11. Country Population of Minnesota according to Census of 1890 excluding all Incorporated places. Each dot represents 100 inhabitants.

Figure 108. Country population in 1890. (Based on Table XI)

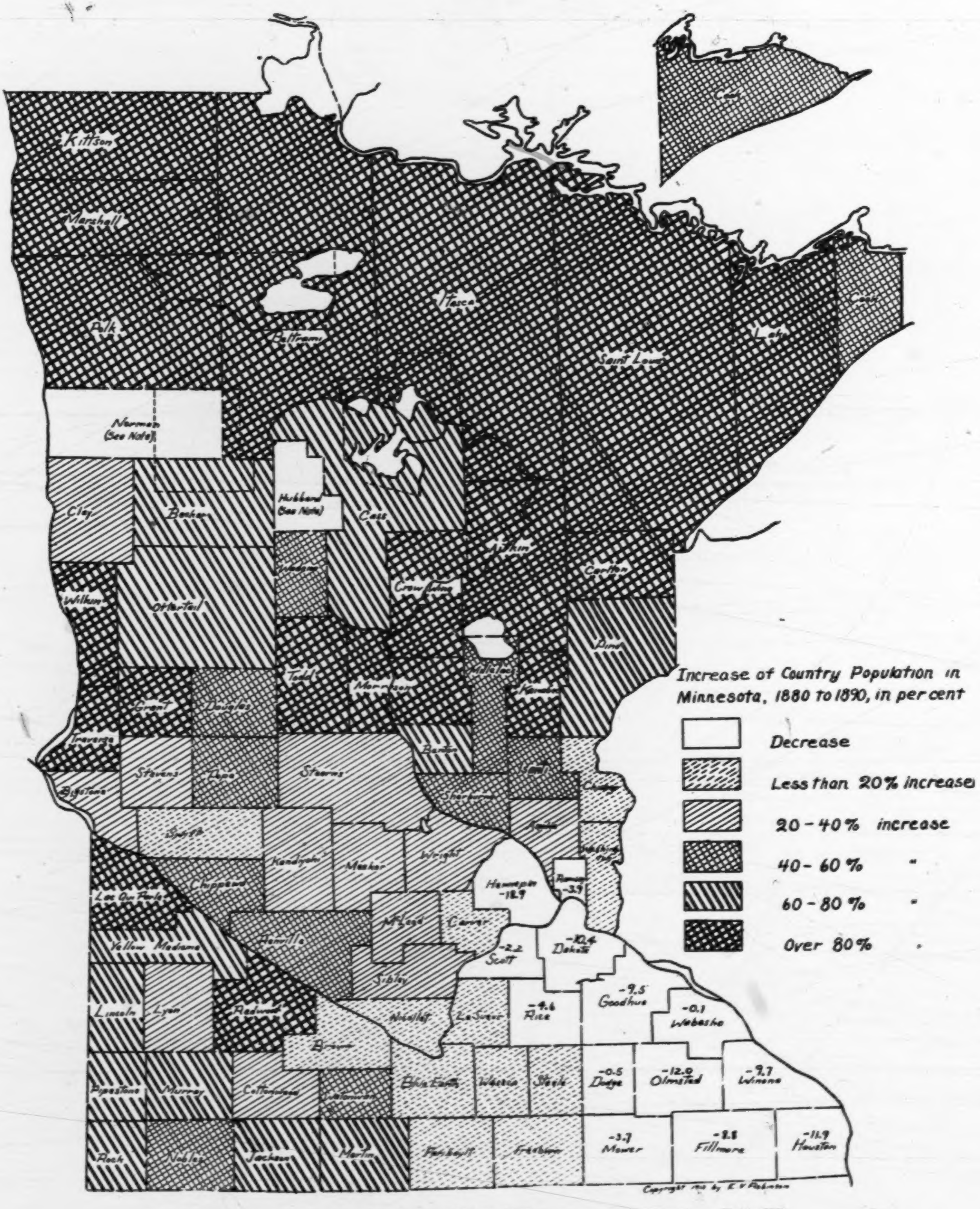
Increase of Country Population in Minnesota, 1880 to 1890, in per cent
Decrease
Less than 20% increase
20-40% increase
40-60% "
60-80% "
Over 80% "
Kittson
Marshall
Polk
Beltrami
Itasca
Saint Louis
Lake
Cook
Norman (See Note)
Clay
Becker
Hubbard (See Note)
Cass
Aitkin
Carlton
Wadena
Crow Wing
Wilkin
Otter Tail
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Benton
Isanti
Stevens
Pope
Stearns
Big Stone
Sherburne
Chisago
Anoka
Swift
Kandiyohi
Meeker
Wright
Washington
Chippewa
Hennepin -11.9
Ramsey -3.9
Lac Qui Parle
McLeod
Carver
Renville
Yellow Medicine
-2.2 Scott
-10.4 Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
-4.6 Rice
-9.5 Goodhue
-0.1 Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
-0.5 Dodge
-12.0 Olmsted
-9.7 Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
-3.7 Mower
-8.8 Fillmore
-11.9 Houston
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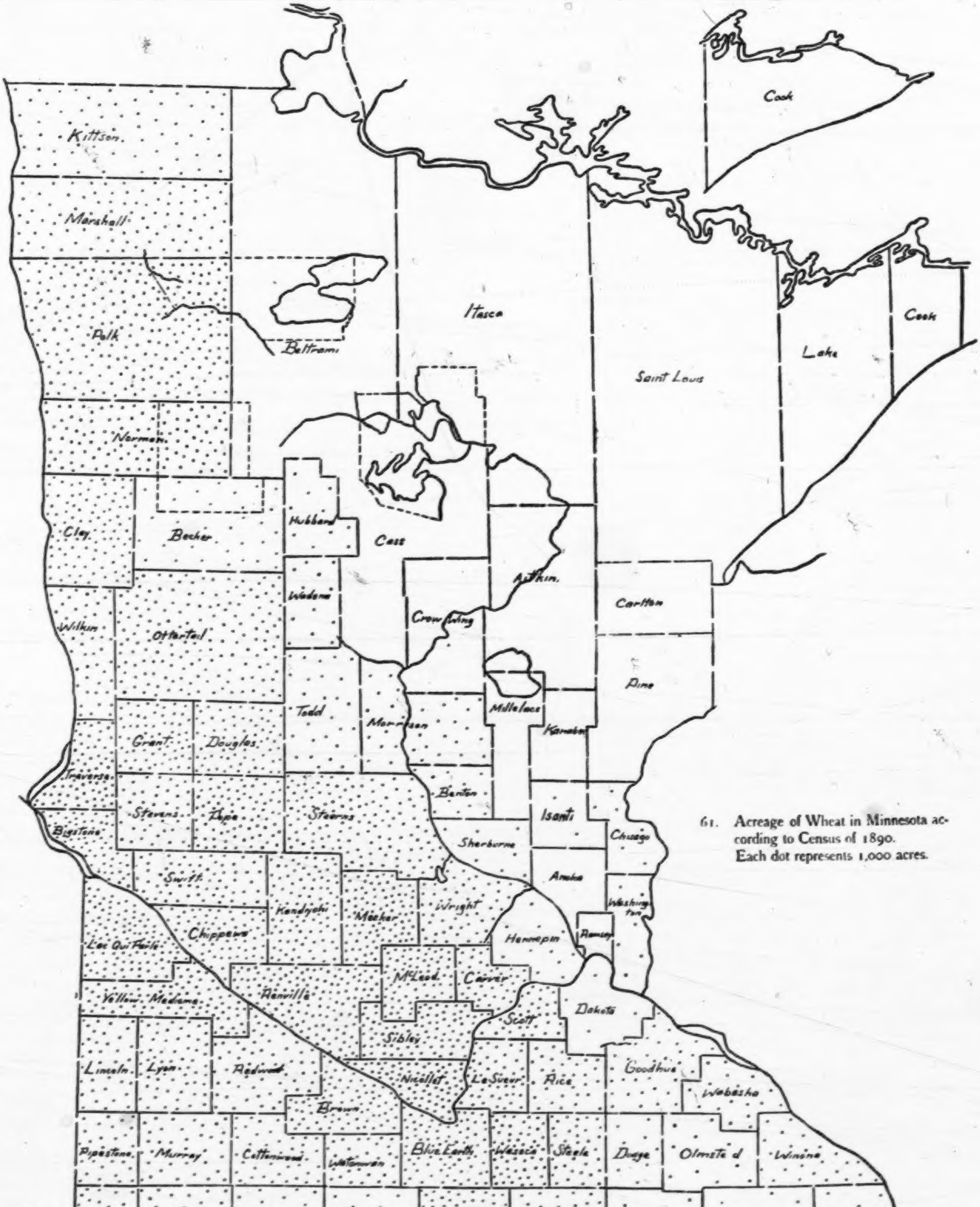
Figure 109. Increase of country population, 1880 to 1890, in percentage. (Based on Table XI)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Blue Earth
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Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
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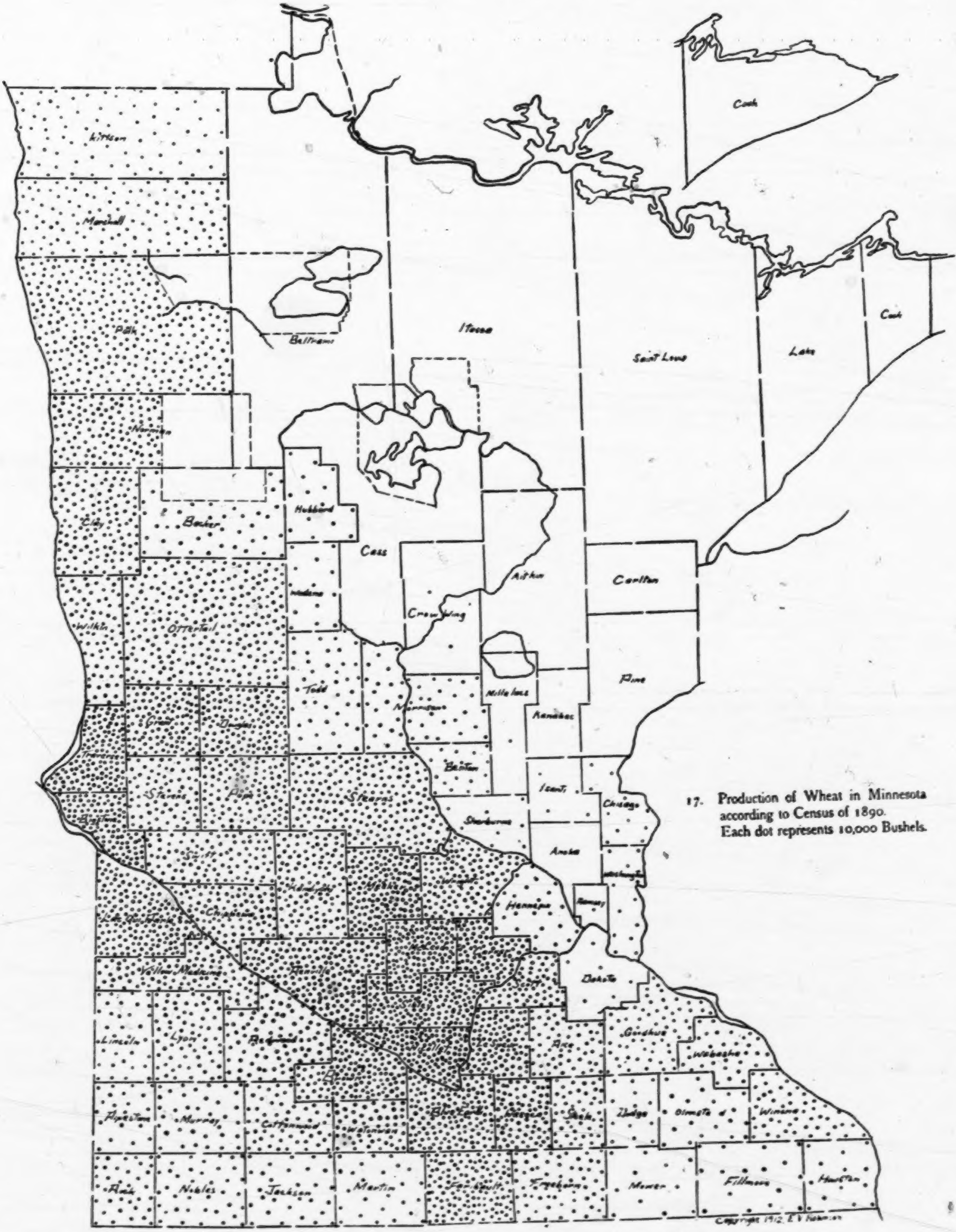
61. Acreage of Wheat in Minnesota according to Census of 1890.
Each dot represents 1,000 acres.

Figure 110. Acreage of wheat in 1889 according to census of 1890. (Based on Table XIII)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Winona
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Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
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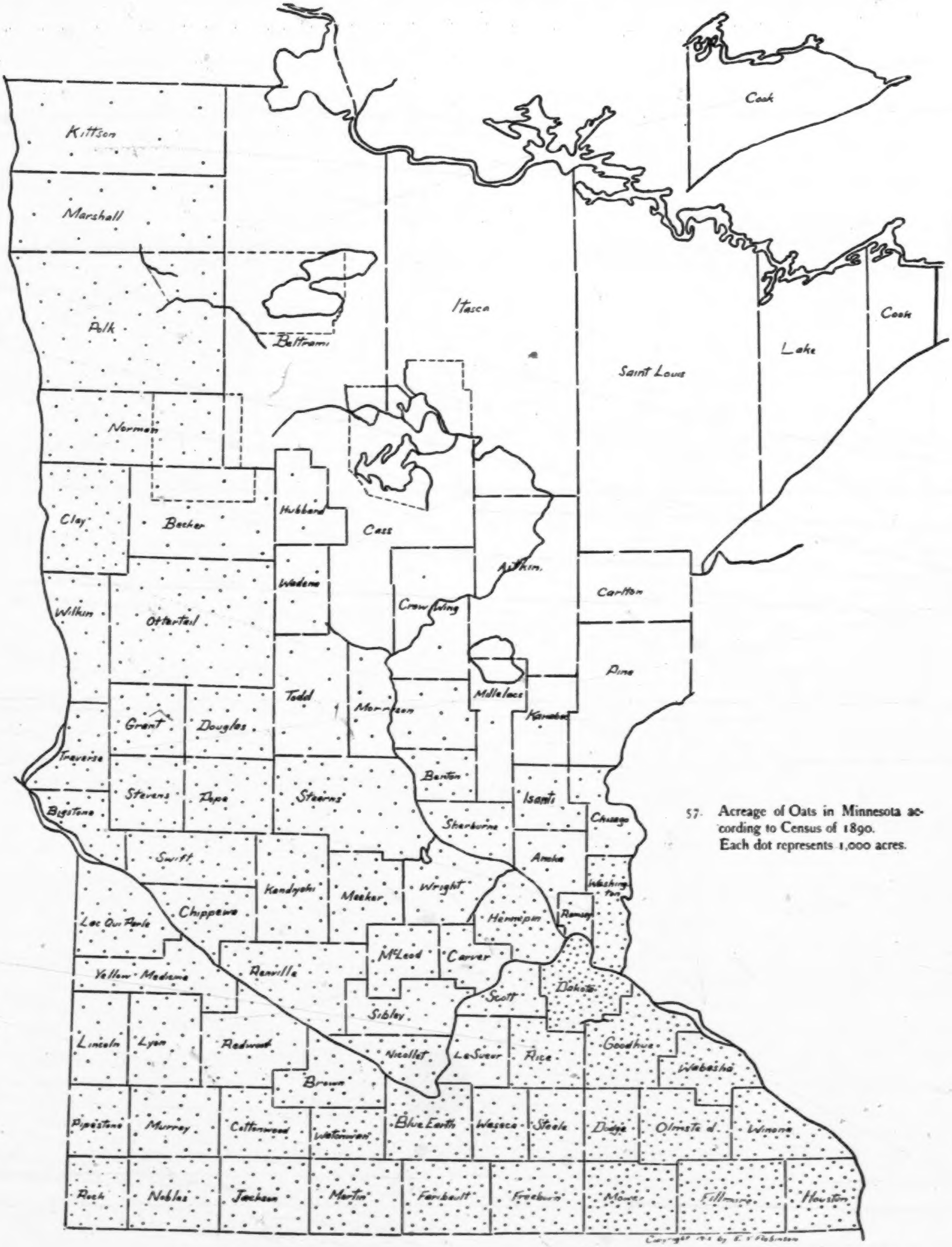
17. Production of Wheat in Minnesota according to Census of 1890.
Each dot represents 10,000 Bushels.

Figure 111. Production of wheat in 1889 according to the census of 1890. (Based on Table XIII)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Crow Wing
Aitkin
Carlton
Wilkin
Ottertail
Pine
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Morrison
Mille Lacs
Kanabec
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Big Stone
Sherburne
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Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
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57. Acreage of Oats in Minnesota according to Census of 1890.
Each dot represents 1,000 acres.

Figure 112. Acreage of oats in 1889 according to census of 1890. (Based on Table XIV)

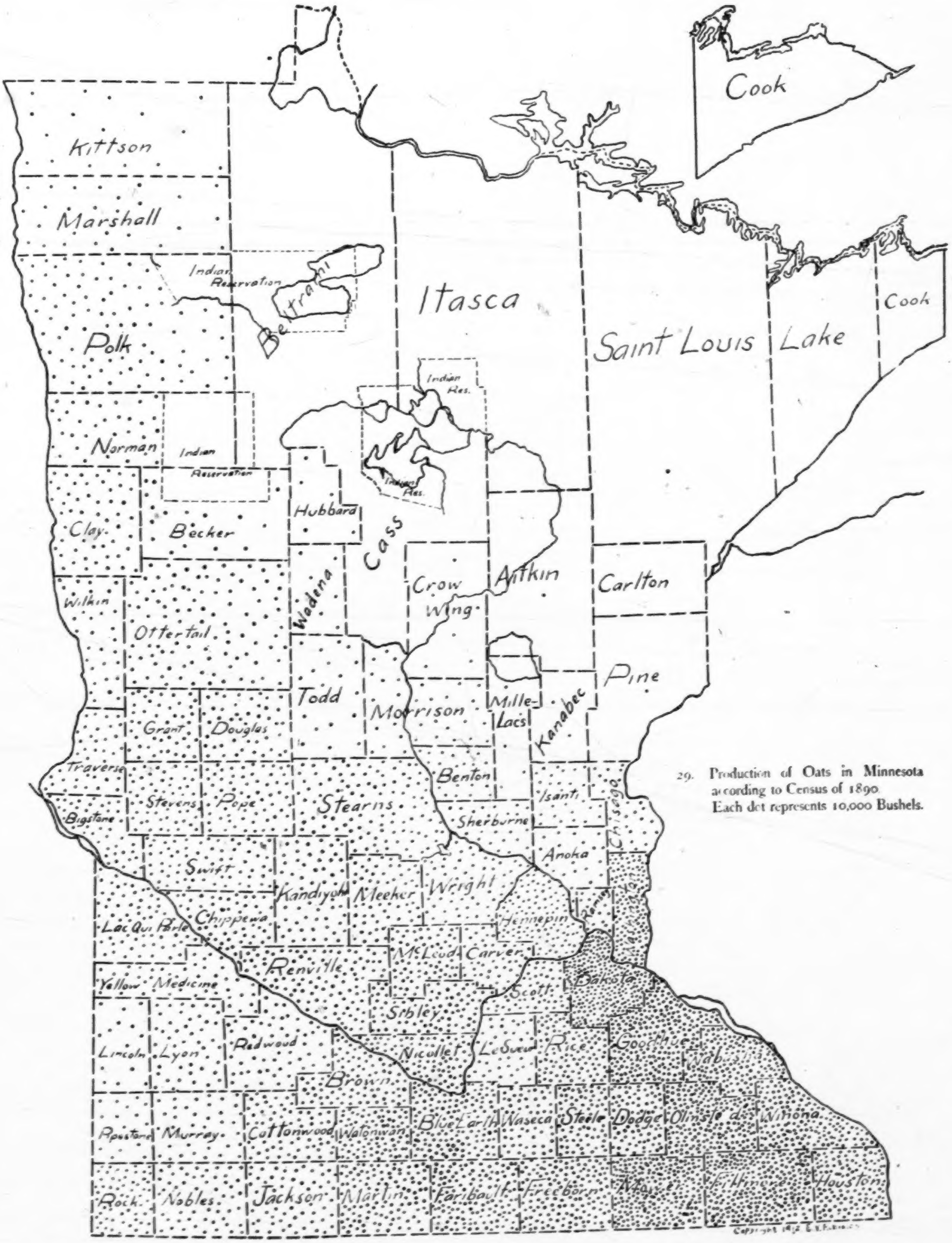
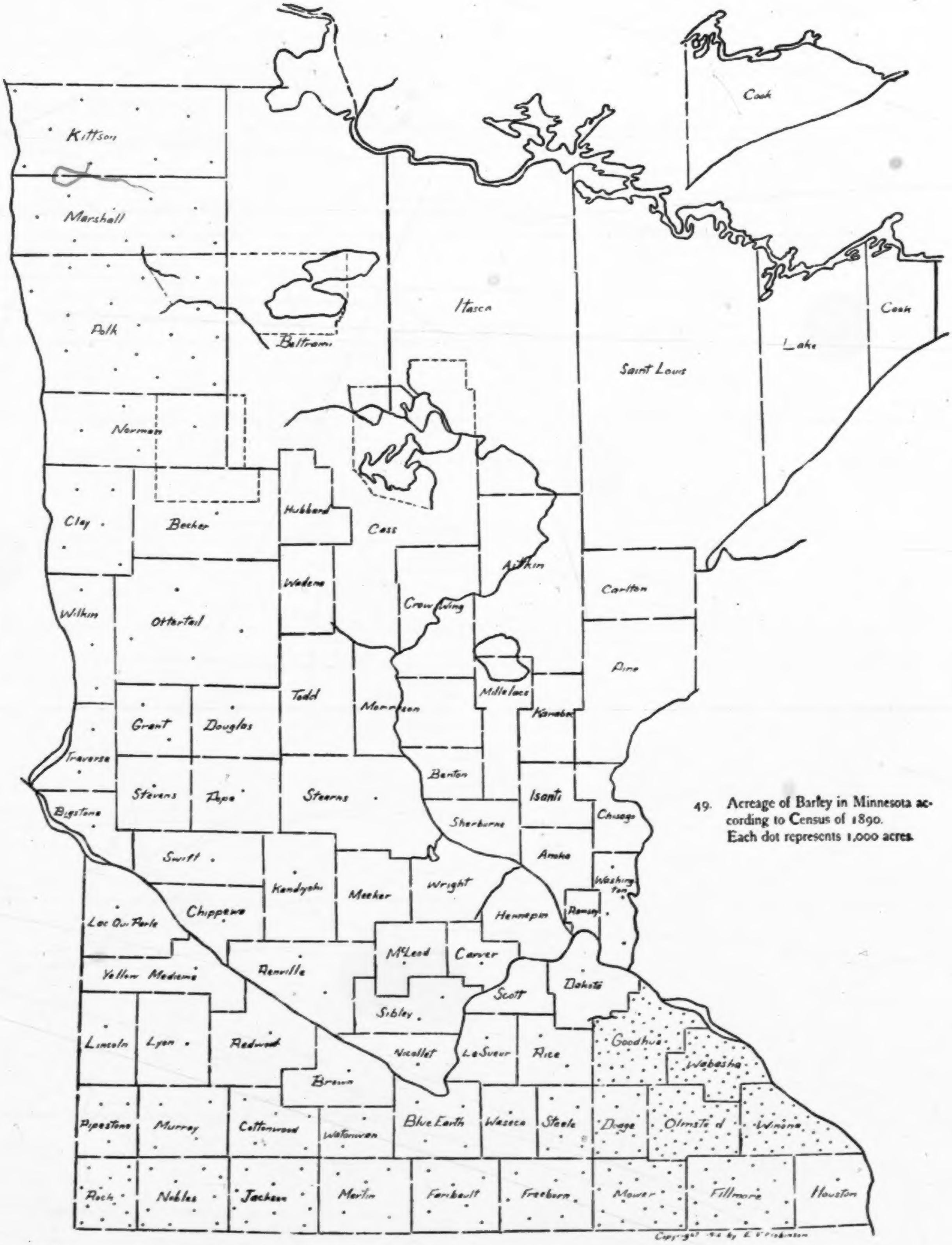

Cook
Kittson
Marshall
Indian Reservation
Beltrami
Itasca
Saint Louis
Lake
Cook
Polk
Indian Res.
Norman
Indian Reservation
Indian Res.
Hubbard
Cass
Clay
Becker
Wilkin
Ottertail
Wadena
Crow Wing
Aitkin
Carlton
Pine
Todd
Morrison
Mille-Lacs
Kanabec
Grant
Douglas
Traverse
Benton
Isanti
Chisago
Stevens
Pope
Stearns
Sherburne
Bigstone
Anoka
Swift
Kandiyohi
Meeker
Wright
Hennepin
Ramsey
Washington
Lac Qui Parle
Chippewa
Renville
McLeod
Carver
Yellow Medicine
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
LeSueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
29. Production of Oats in Minnesota according to Census of 1890. Each dot represents 10,000 Bushels.
Copyright 1912 E. E. Edwards

Figure 113. Production of oats in 1889 according to the census of 1890. (Based on Table XIV)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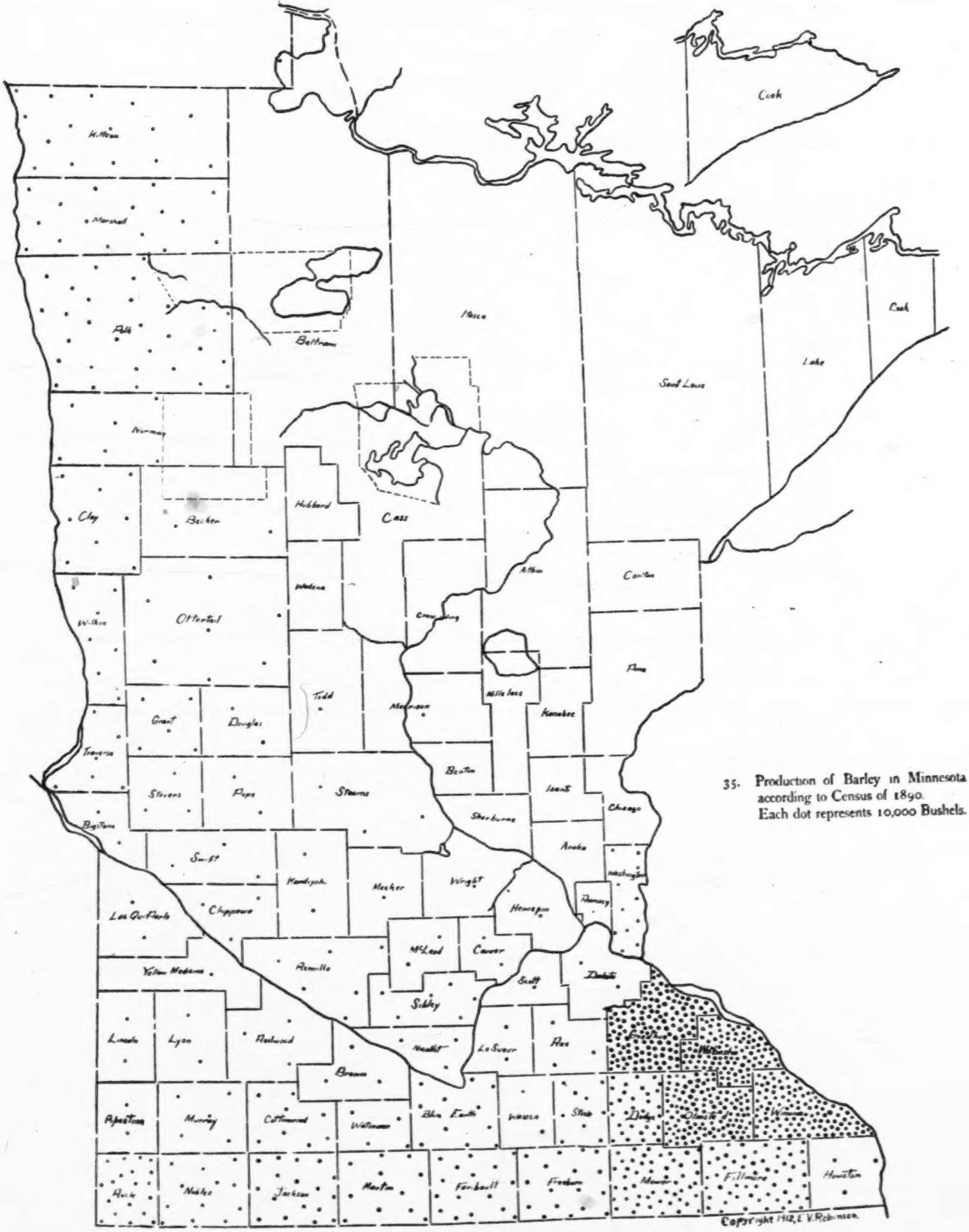
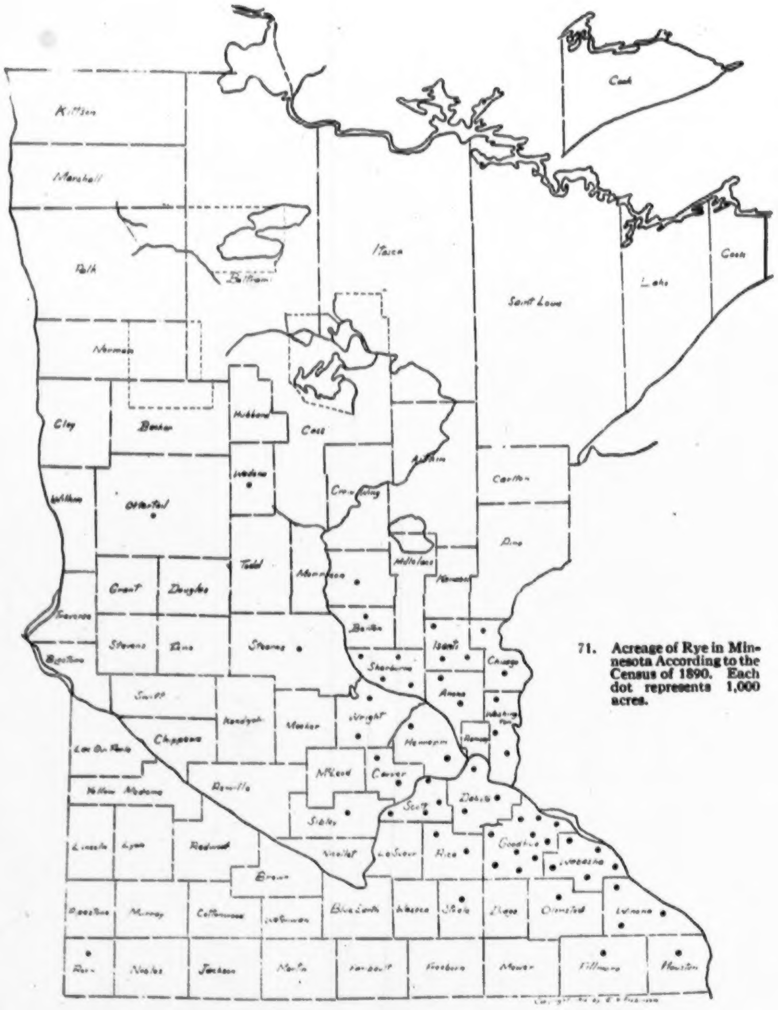
Marshall
Polk
Beltrami
Itasca
Cook
Lake
Cook
Saint Louis
Norman
Clay
Becker
Hubbard
Cass
Wadena
Aitkin
Carlton
Crow Wing
Wilkin
Ottertail
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Bigstone
Sherburne
Chisago
49. Acreage of Barley in Minnesota according to Census of 1890.
Each dot represents 1,000 acres.
Swift
Anoka
Kandiyohi
Meeker
Wright
Washington
Lac Qui Parle
Chippewa
Hennepin
Ramsey
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Goodhue
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Copyright [illegible] by E. V. Robinson

Figure 114. Acreage of barley in 1889 according to census of 1890. (Based on Table XVI)


Kittson
Marshall
Polk
Beltrami
Itasca
Cook
Saint Louis
Lake
Cook
Norman
Clay
Becker
Hubbard
Cass
Aitkin
Carlton
Wadena
Wilkin
Ottertail
Crow Wing
Pine
Mille Lacs
Kanabec
Todd
Morrison
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Sherburne
Big Stone
Anoka
Swift
Washington
Kandiyohi
Meeker
Wright
Ramsey
Hennepin
Lac Qui Parle
Chippewa
McLeod
Carver
Renville
Yellow Medicine
Scott
Dakota
Sibley
Goodhue
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Copyright 1912, E. V. Robinson.

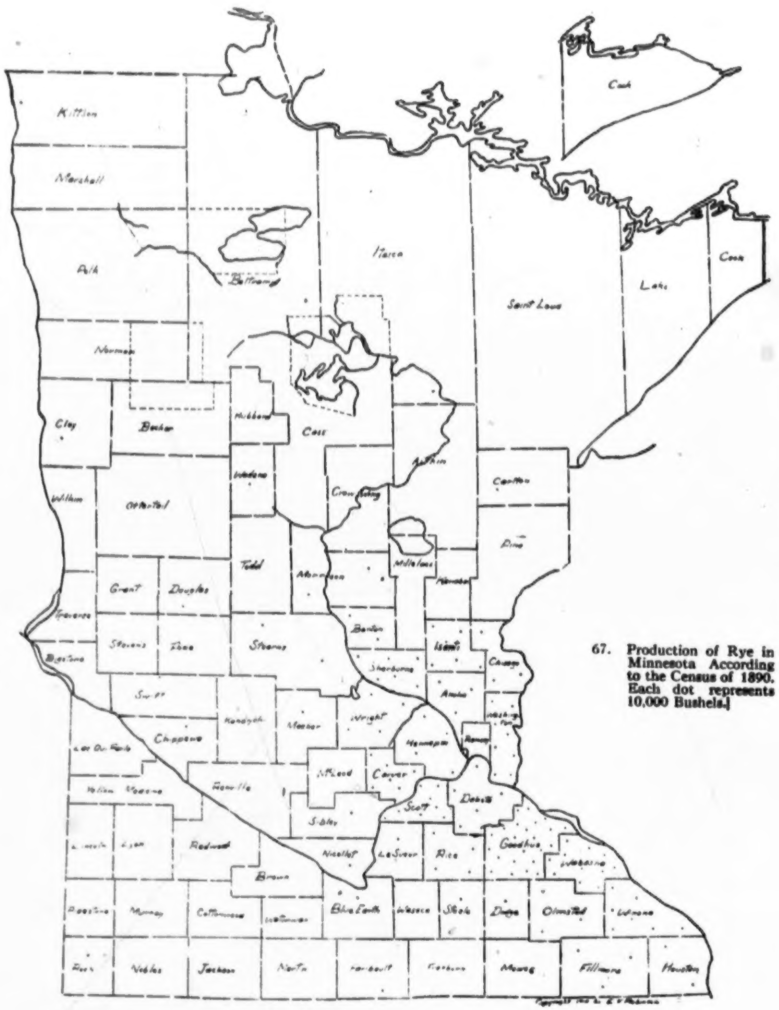
35. Production of Barley in Minnesota according to Census of 1890.
Each dot represents 10,000 Bushels.

Figure 115. Production of barley in 1889 according to census of 1890. (Based on Table XVI)


Kittson
Marshall
Polk
Beltrami
Itasca
Saint Louis
Lake
Cook
Norman
Clay
Becker
Hubbard
Cass
Wadena
Aitkin
Carlton
Wilkin
Otter Tail
Crow Wing
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Stevens
Pope
Stearns
Benton
Sherburne
Isanti
Chisago
Anoka
Washington
Big Stone
Swift
Kandiyohi
Meeker
Wright
Hennepin
Ramsey
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

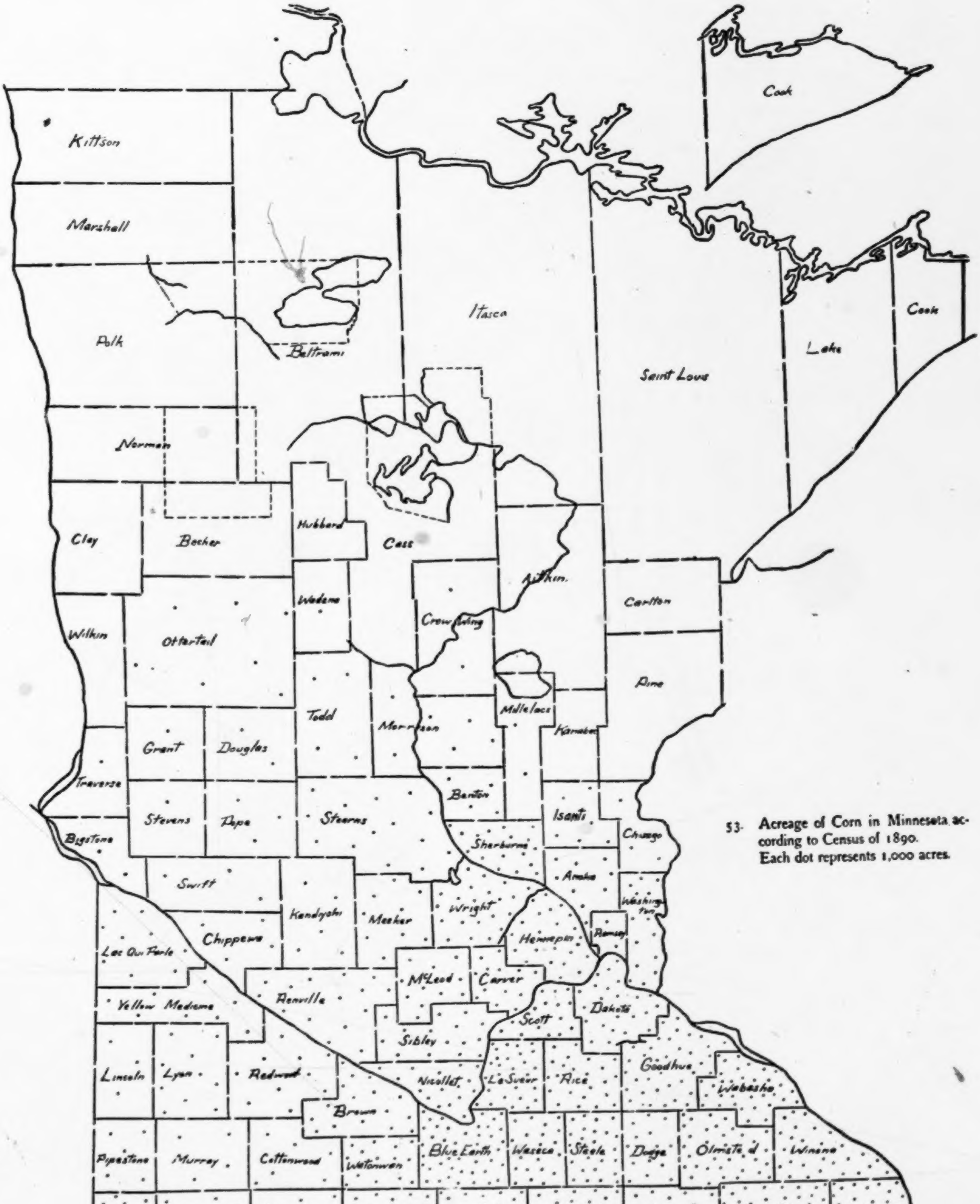
71. Acreage of Rye in Minnesota According to the Census of 1890. Each dot represents 1,000 acres.

Figure 116. Acreage of rye in 1889 according to census of 1890. (Based on Table XVII)


Kittson
Marshall
Polk
Beltrami
Itasca
Saint Louis
Lake
Cook
Norman
Clay
Becker
Hubbard
Cass
Wadena
Aitkin
Carlton
Wilkin
Otter Tail
Crow Wing
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Stevens
Pope
Stearns
Benton
Sherburne
Isanti
Chisago
Anoka
Washington
Big Stone
Swift
Kandiyohi
Meeker
Wright
Hennepin
Ramsey
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

67. Production of Rye in Minnesota According to the Census of 1890. Each dot represents 10,000 Bushels.]

Figure 117. Production of rye in 1889 according to census of 1890. (Based on Table XVII)


Cook
Kittson
Marshall
Polk
Beltrami
Itasca
Saint Louis
Lake
Cook
Norman
Clay
Becker
Hubbard
Cass
Aitkin
Carlton
Wilkin
Ottertail
Wadena
Crow Wing
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Bigstone
Sherburne
Swift
Anoka
Kandiyohi
Meeker
Wright
Washington
Chippewa
Hennepin
Ramsey
Lac Qui Parle
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
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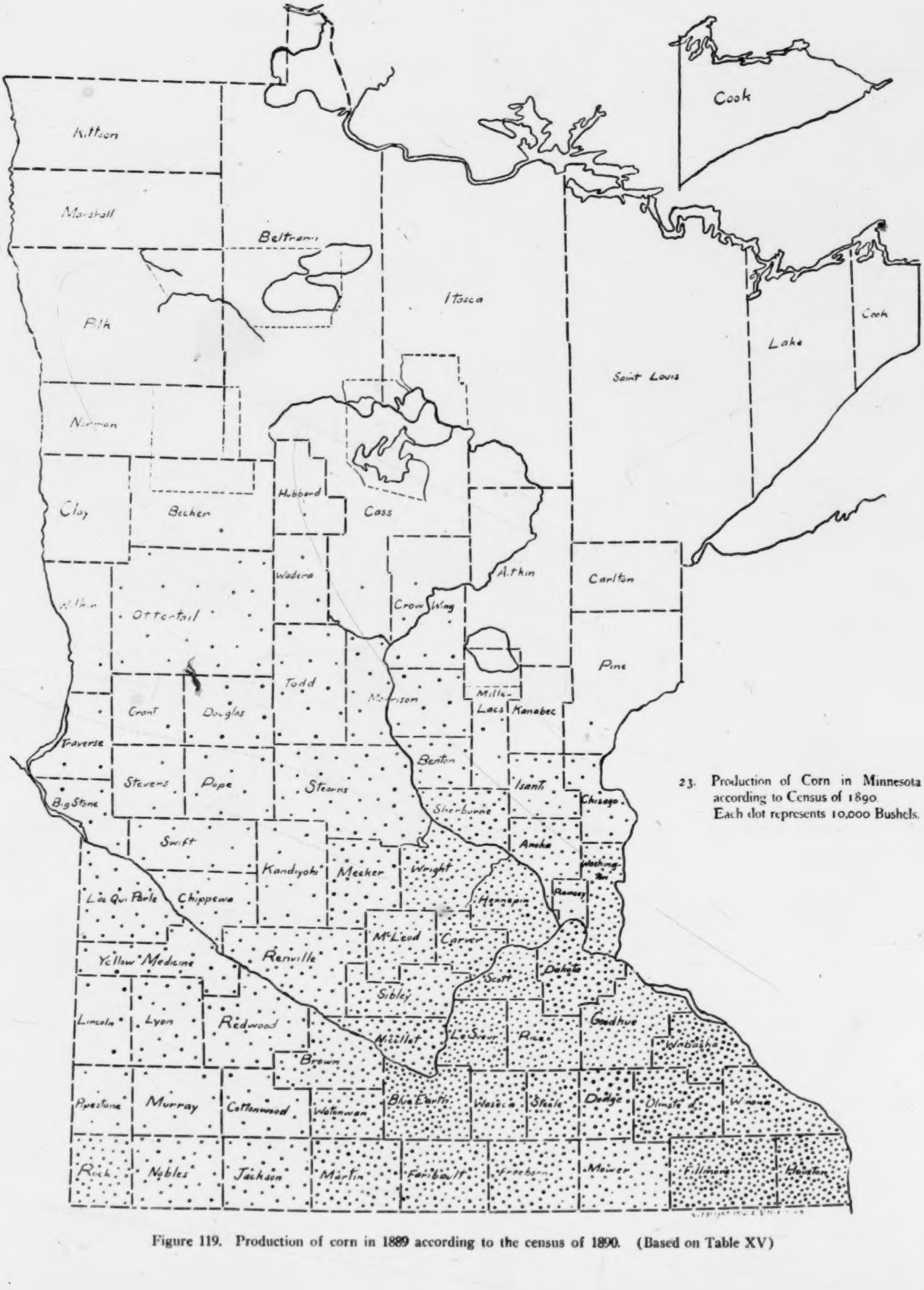
53. Acreage of Corn in Minnesota according to Census of 1890.
Each dot represents 1,000 acres.

Figure 118. Acreage of corn in 1889 according to the census of 1890. (Based on Table XV)


Kittson
Marshall
Beltrami
Polk
Itasca
Cook
Lake
Cook
Saint Louis
Norman
Clay
Becker
Hubbard
Cass
Wadena
Aitkin
Carlton
Wilkin
Ottertail
Crow Wing
Todd
Pine
Grant
Douglas
Morrison
Mille Lacs
Kanabec
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Big Stone
Sherburne
Chisago
Swift
Anoka
Kandiyohi
Meeker
Wright
Washington
Lac Qui Parle
Chippewa
Hennepin
Ramsey
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

23. Production of Corn in Minnesota according to Census of 1890. Each dot represents 10,000 Bushels.

Figure 119. Production of corn in 1889 according to the census of 1890. (Based on Table XV)

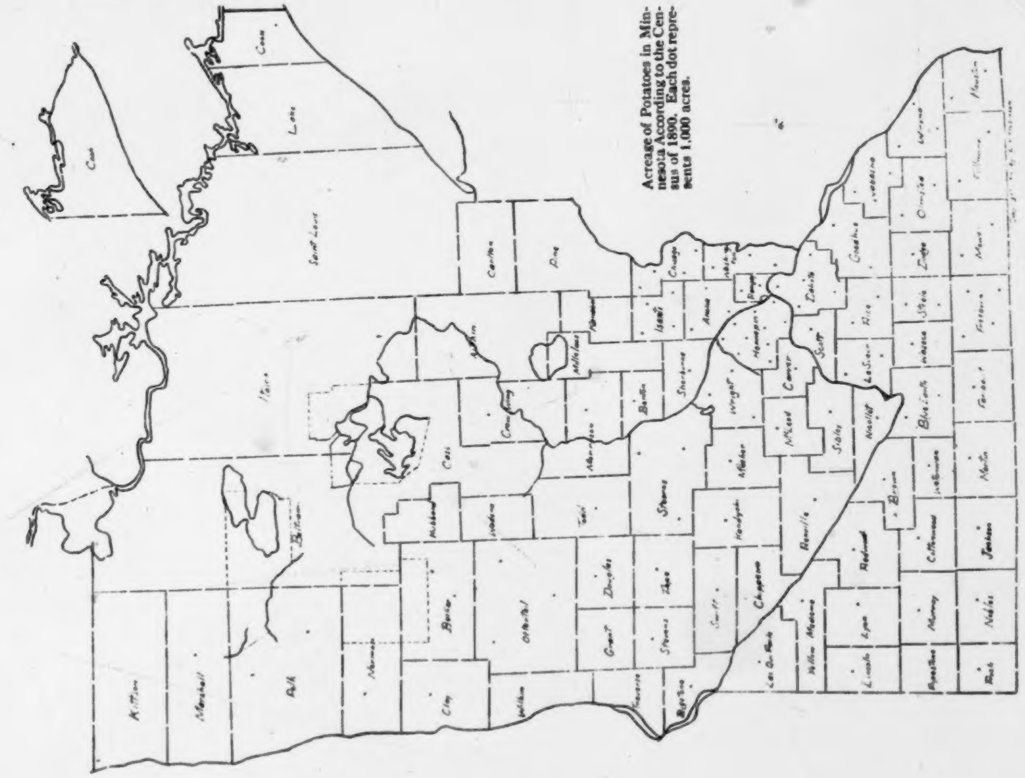

Acreage of Potatoes in Minnesota According to the Census of 1890. Each dot represents 1,000 acres.

Figure 120. Acreage of potatoes in 1889 according to census of 1890. (Based on Table XVIII)

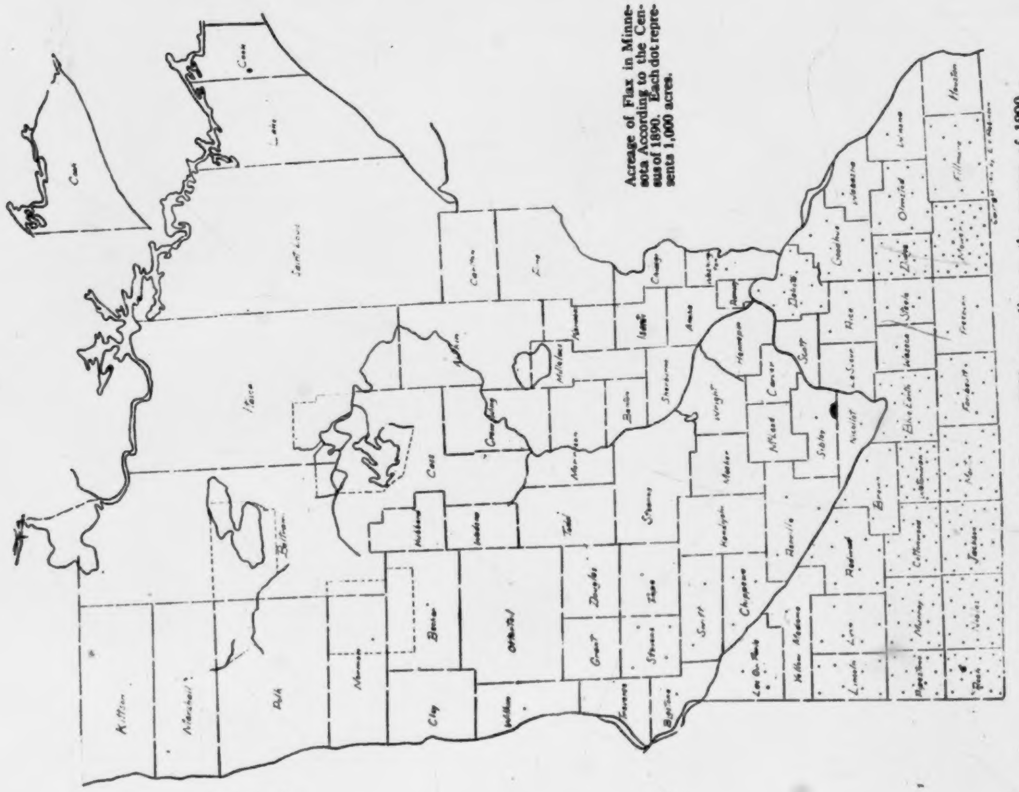
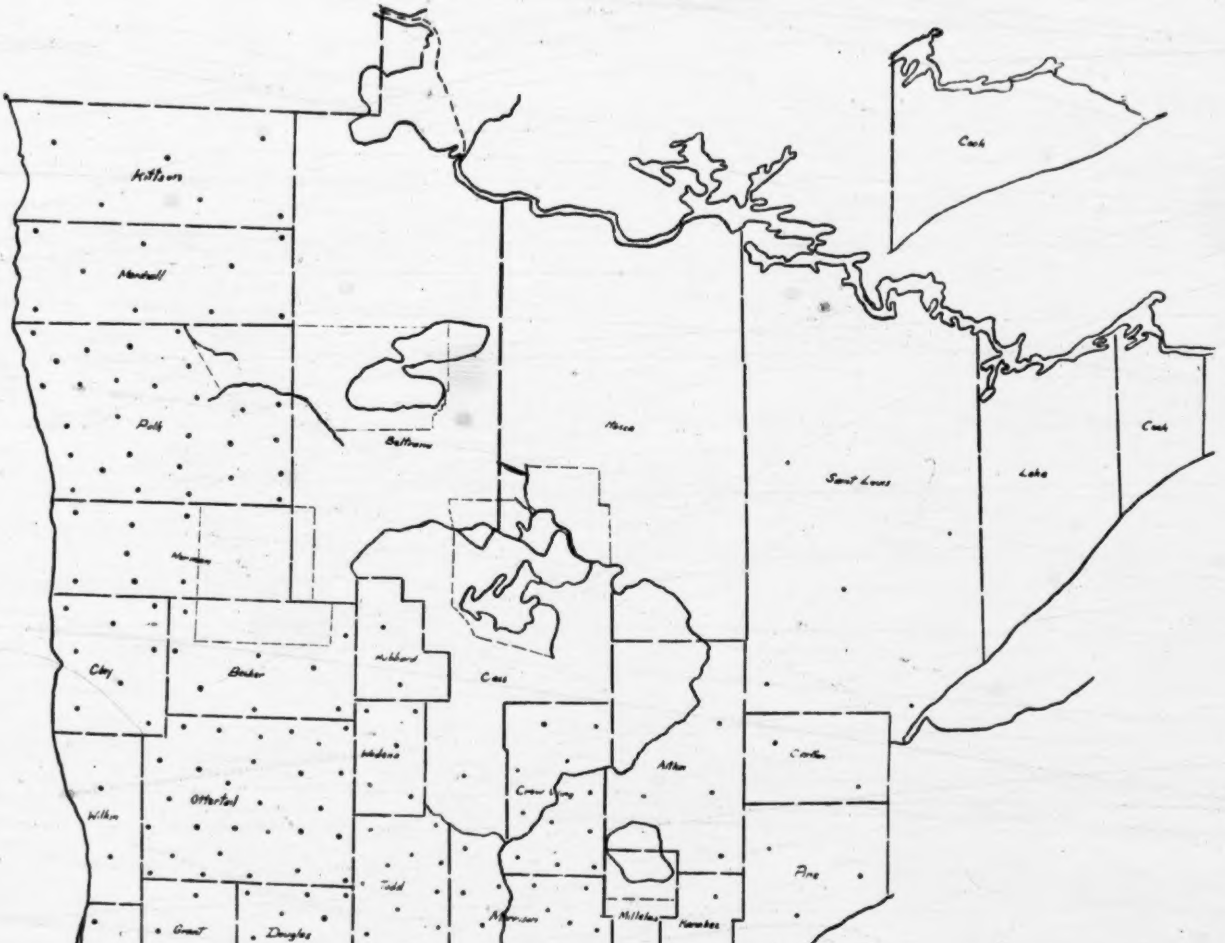

Acreage of Flax in Minnesota According to the Census of 1890. Each dot represents 1,000 acres.

Figure 121. Acreage of flax in 1889 according to the census of 1890. (Based on Table XIX)


Kittson
Marshall
Polk
Norman
Beltrami
Itasca
Saint Louis
Lake
Cook
Cook
Clay
Becker
Hubbard
Cass
Wadena
Carlton
Crow Wing
Aitkin
Wilkin
Ottertail
Todd
Pine
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Benton
Isanti
Chisago
Stevens
Pope
Stearns
Big Stone
Sherburne
Anoka
Swift
Washington
Kandiyohi
Meeker
Wright
Ramsey
Lac Qui Parle
Chippewa
Hennepin
McLeod
Carver
Yellow Medicine
Renville
Dakota
Scott
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
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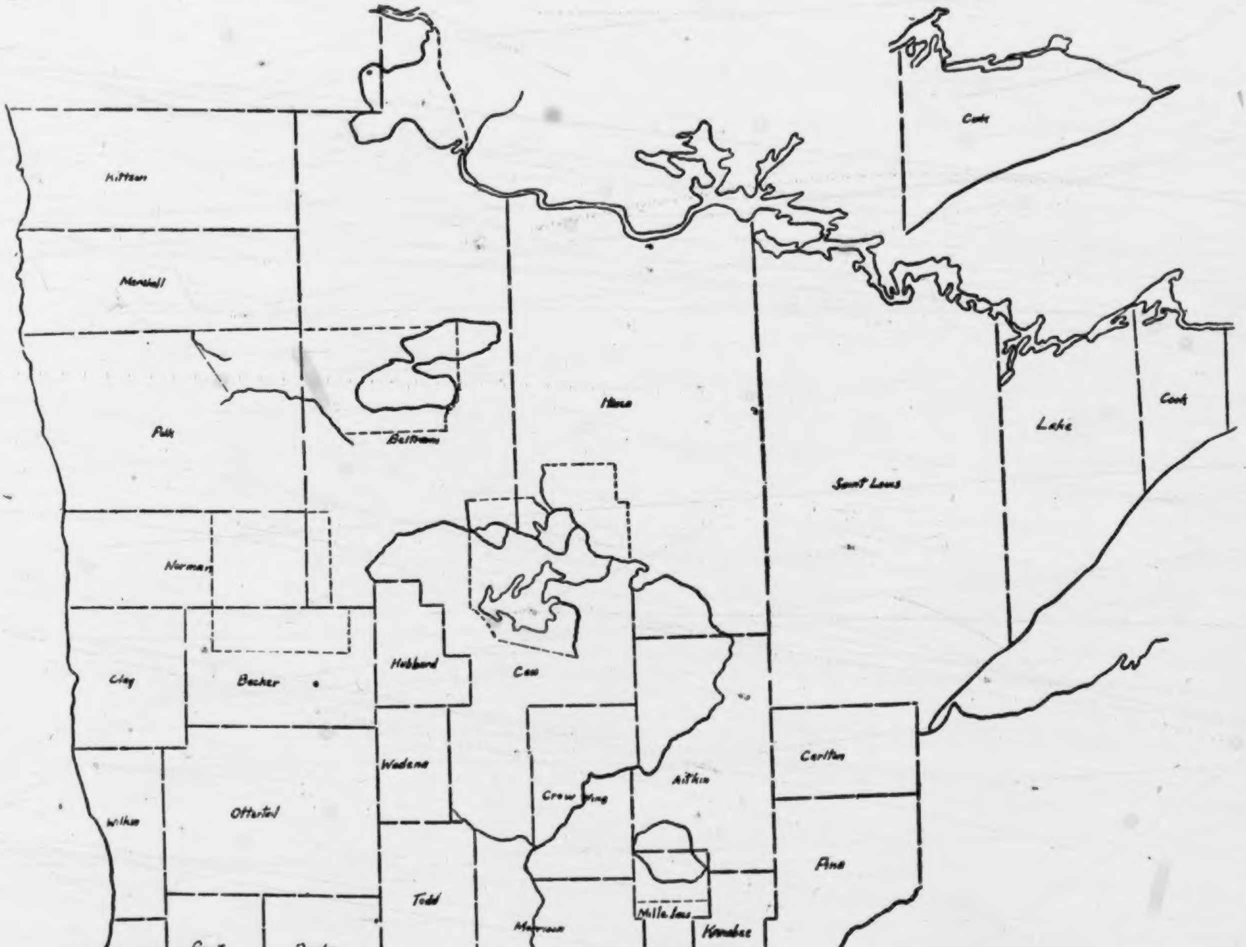
41. Production of Potatoes in Minnesota according to Census of 1890. Each dot represents 10,000 Bushels.

Figure 122. Production of potatoes in 1889 according to census of 1890. (Based on Table XVIII)


Cook
Kittson
Marshall
Polk
Beltrami
Itasca
Saint Louis
Lake
Cook
Norman
Clay
Becker
Hubbard
Cass
Wadena
Crow Wing
Aitkin
Carlton
Wilkin
Ottertail
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Benton
Isanti
Chisago
Stevens
Pope
Stearns
Bigstone
Sherburne
Anoka
Swift
Washington
Kandiyohi
Meeker
Wright
Ramsey
Lac Qui Parle
Chippewa
Hennepin
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Copyright 1912 E. V. Robinson

45. Production of Flaxseed in Minnesota, according to Census of 1890. Each dot represents 10,000 Bushels.

Figure 123. Production of flaxseed in 1889 according to the census of 1890. (Based on Table XIX)

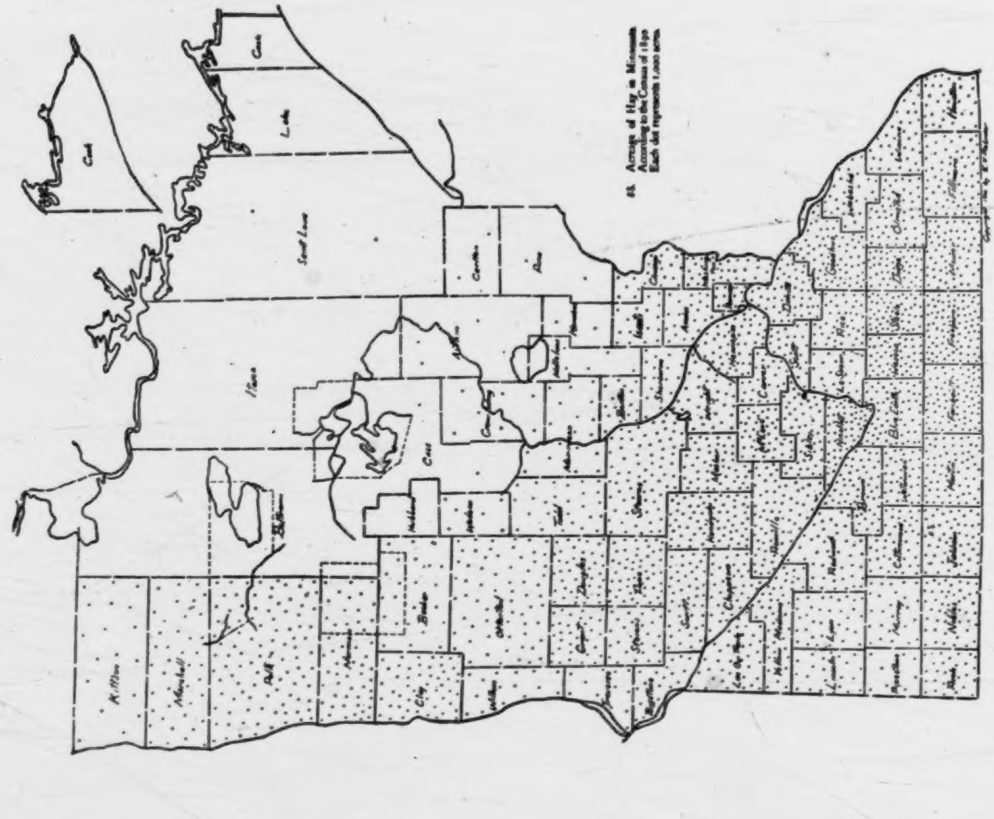

41. Acreage of Hay in Minnesota According to the Census of 1890 Each dot represents 1,000 acres

Figure 124. Acreage of wild and cultivated hay in 1889 according to the census of 1890.

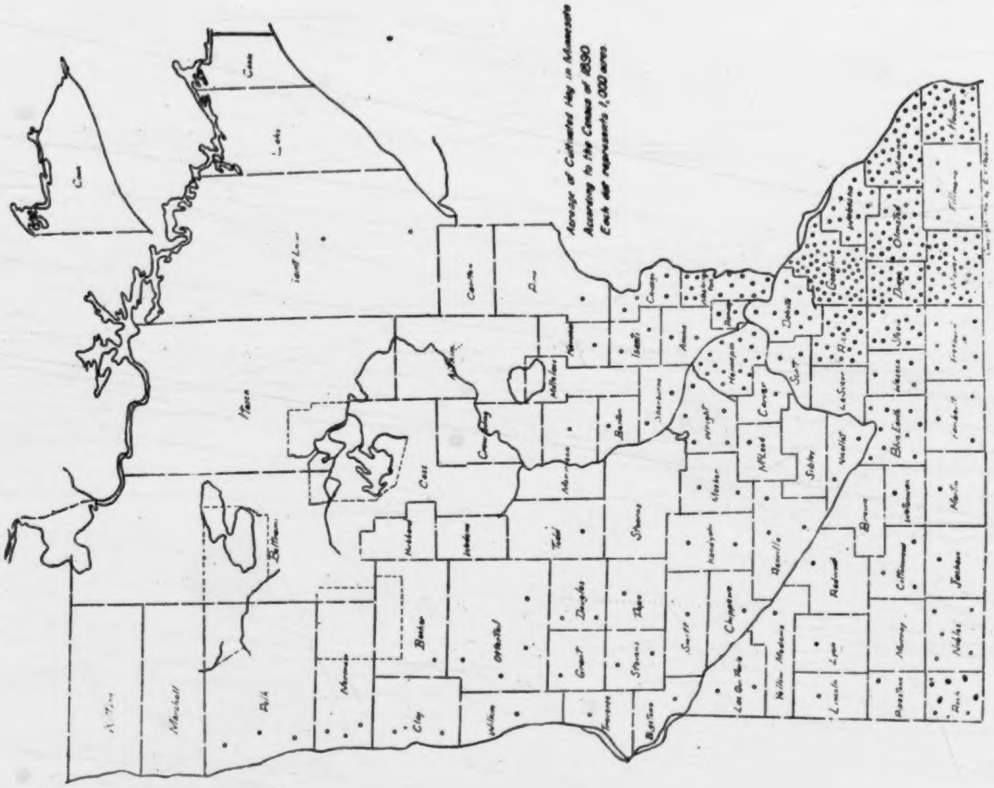

Acreage of Cultivated Hay in Minnesota According to the Census of 1890 Each dot represents 1,000 acres

Figure 125. Acreage of cultivated hay in 1889 according to the census of 1890.[27]

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[27] Ann. Rept. Comr. of Statistics, 1890, 41.

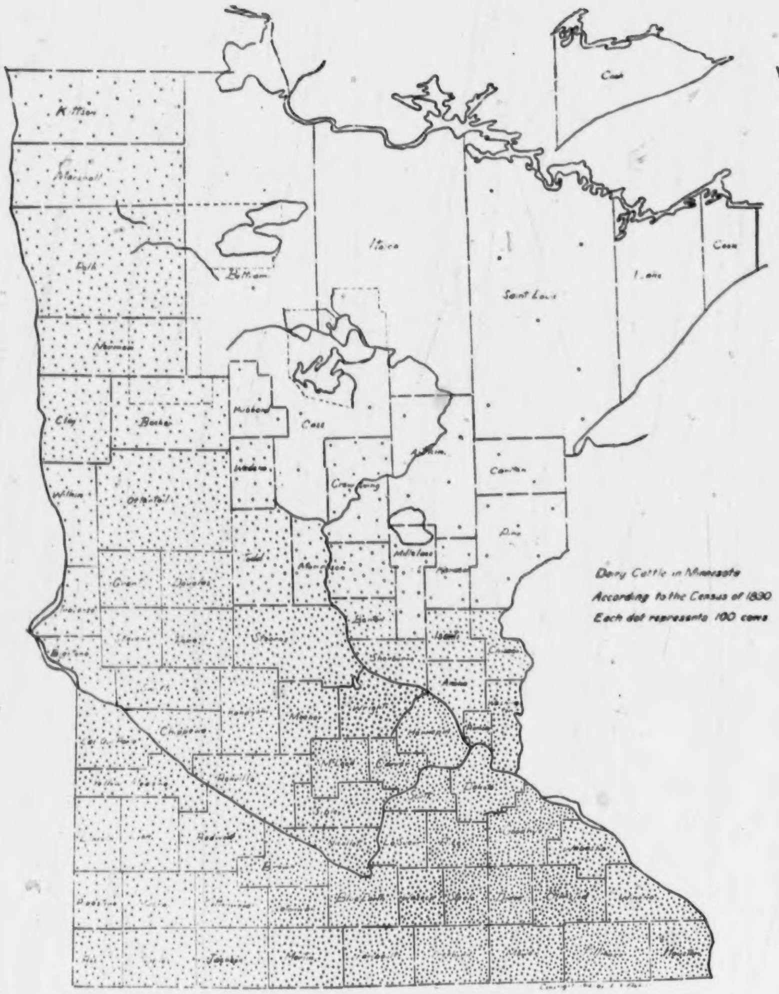
Dairy Cattle in Minnesota
According to the Census of 1890
Each dot represents 100 cows

Figure 126. Dairy cows according to the census of 1890.
(Based on Table XXIV)

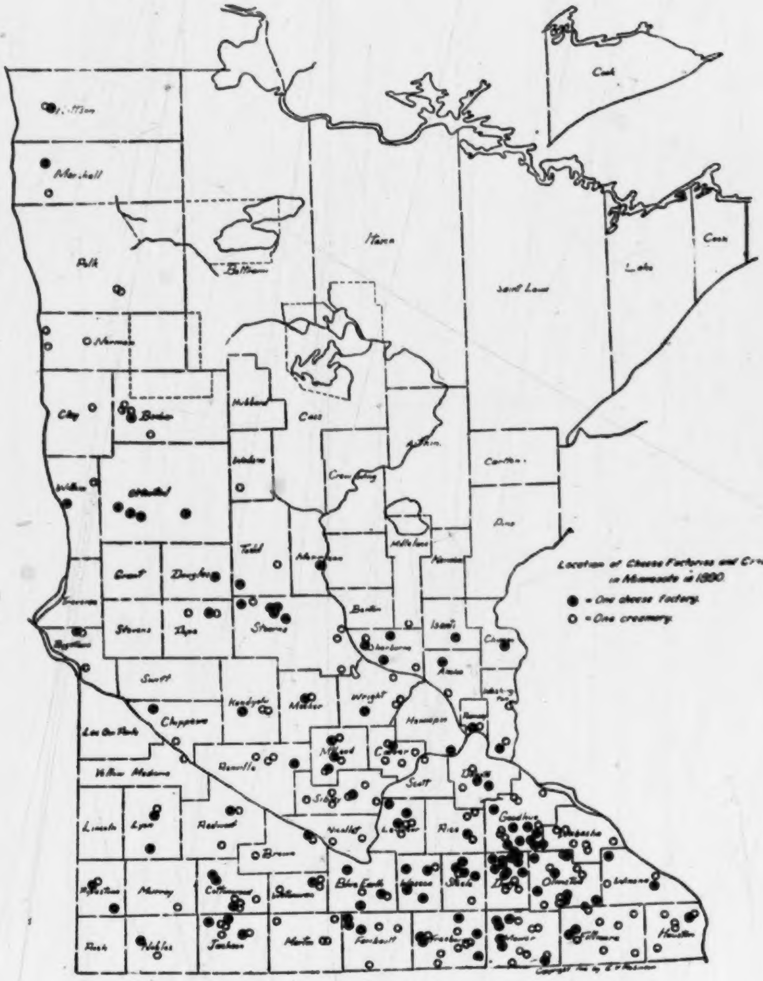
Location of Cheese Factories and Creameries in Minnesota in 1890
● = One cheese factory.
○ = One creamery.

Figure 127. Distribution of cheese factories and creameries in 1890.[28]

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[28] *Report of Dairy and Food Dept.*, 1891, 323.

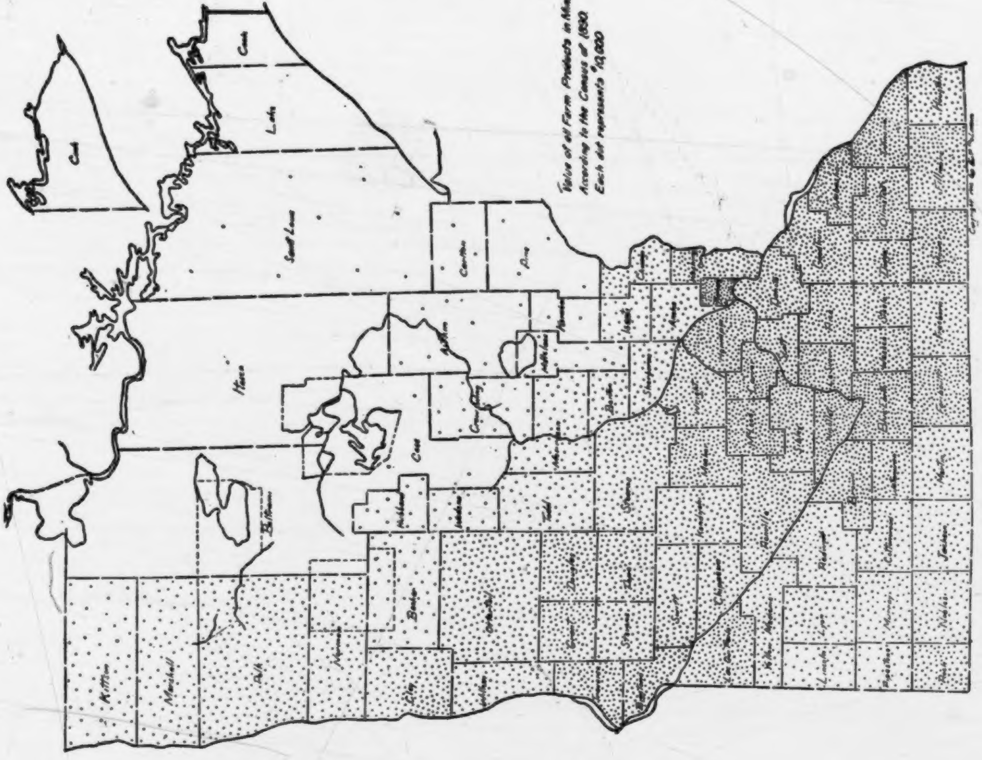
Value of all Farm Products in Minnesota
According to the Census of 1890
Each dot represents $10,000

Figure 129. Total value of all farm products in 1889 according to the census of 1890. (Based on Table XXXV)

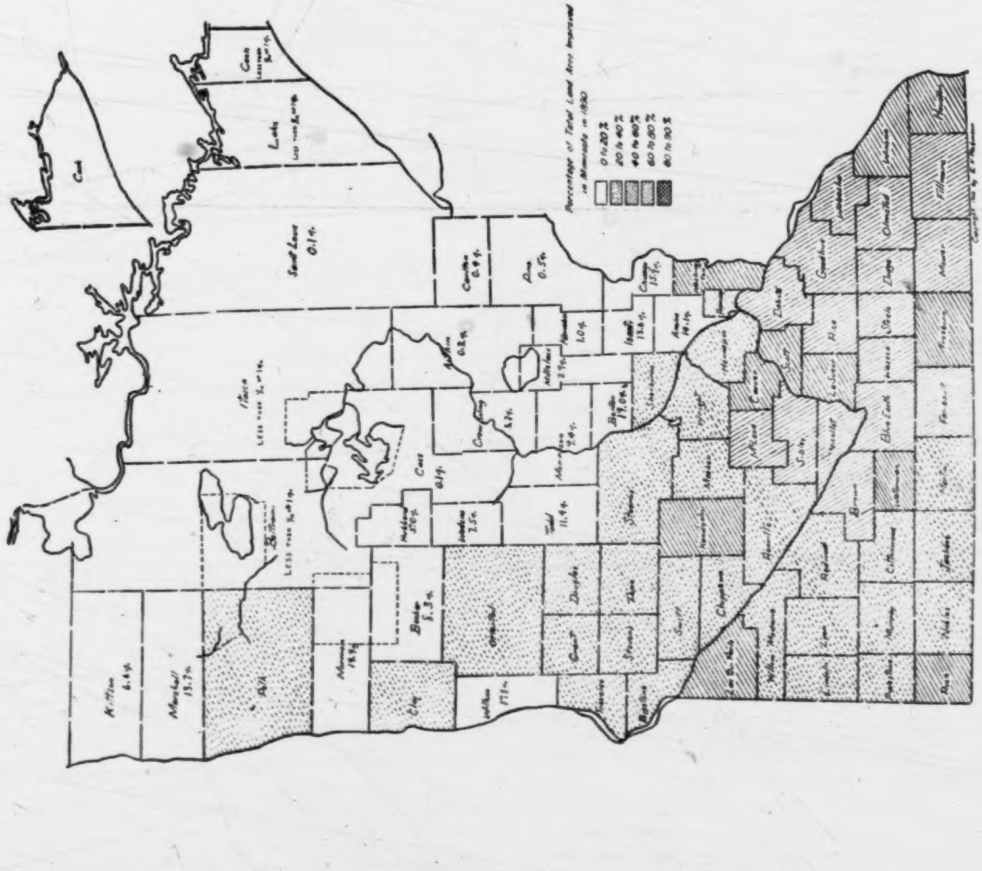
Percentage of Total Land Area Improved
in Minnesota in 1890
0 to 20%
20 to 40%
40 to 60%
60 to 80%
80 to 90%

Figure 128. Percentage of total land area improved in 1890.

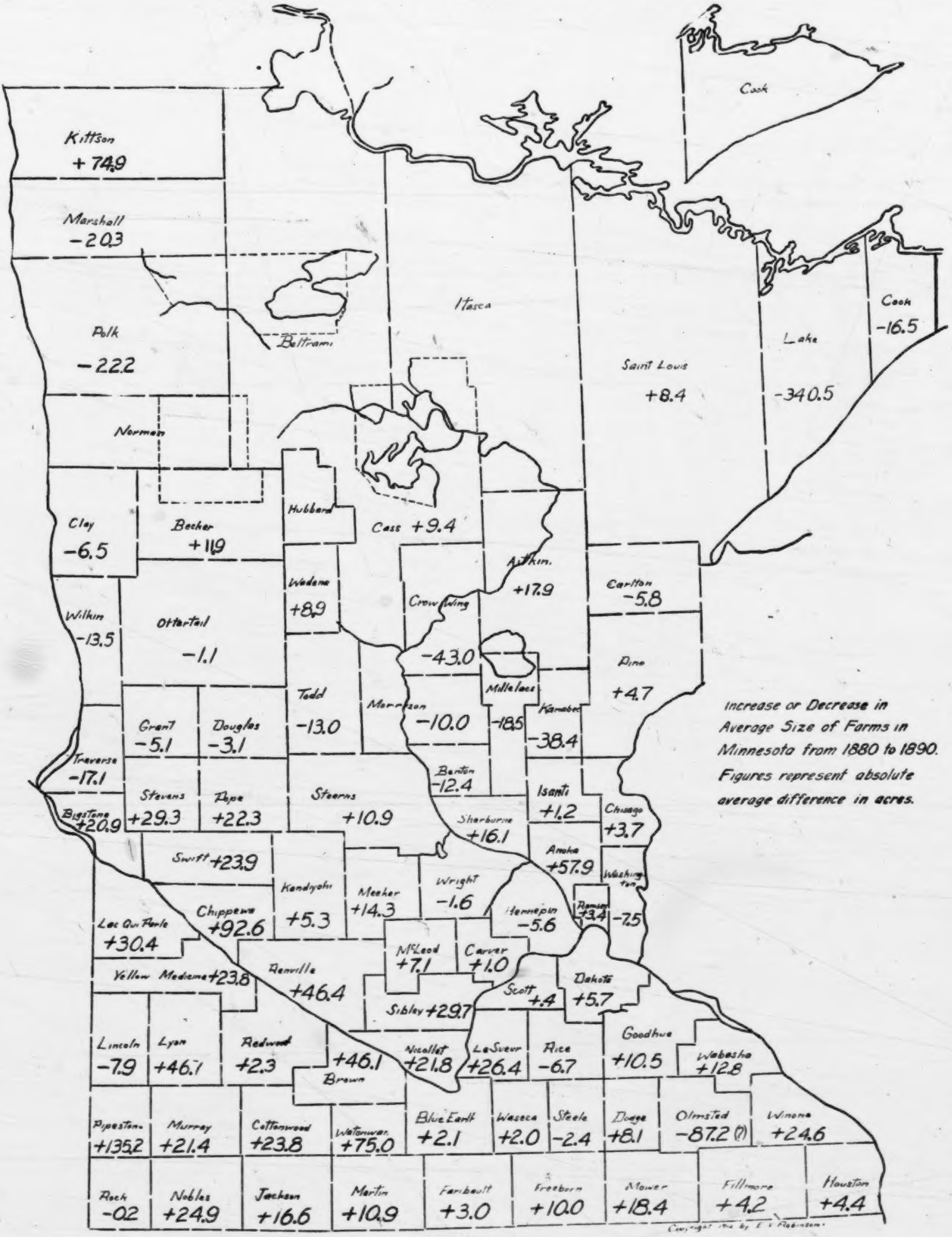
Cook
Kittson
+74.9
Marshall
-20.3
Polk
-22.2
Beltrami
Itasca
Saint Louis
+8.4
Lake
-340.5
Cook
-16.5
Norman
Clay
-6.5
Becker
+11.9
Hubbard
Cass +9.4
Wadena
+8.9
Crow Wing
-43.0
Aitkin.
+17.9
Carlton
-5.8
Wilkin
-13.5
Ottertail
-1.1
Pine
+4.7
Todd
-13.0
Morrison
-10.0
Mille Lacs
-18.5
Kanabec
-38.4
Grant
-5.1
Douglas
-3.1
Traverse
-17.1
Benton
-12.4
Isanti
+1.2
Chisago
+3.7
Stevens
+29.3
Pope
+22.3
Stearns
+10.9
Sherburne
+16.1
Big Stone
+20.9
Anoka
+57.9
Swift +23.9
Washington
-7.5
Kandiyohi
+5.3
Meeker
+14.3
Wright
-1.6
Hennepin
-5.6
Ramsey
+3.4
Lac Qui Parle
+30.4
Chippewa
+92.6
McLeod
+7.1
Carver
+1.0
Yellow Medicine +23.8
Renville
+46.4
Scott
+.4
Dakota
+5.7
Sibley +29.7
Goodhue
+10.5
Wabasha
+12.8
Lincoln
-7.9
Lyon
+46.7
Redwood
+2.3
+46.1
Brown
Nicollet
+21.8
Le Sueur
+26.4
Rice
-6.7
Pipestone
+135.2
Murray
+21.4
Cottonwood
+23.8
Watonwan
+75.0
Blue Earth
+2.1
Waseca
+2.0
Steele
-2.4
Dodge
+8.1
Olmsted
-87.2 (?)
Winona
+24.6
Rock
-0.2
Nobles
+24.9
Jackson
+16.6
Martin
+10.9
Faribault
+3.0
Freeborn
+10.0
Mower
+18.4
Fillmore
+4.2
Houston
+4.4
Increase or Decrease in Average Size of Farms in Minnesota from 1880 to 1890.
Figures represent absolute average difference in acres.
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Figure 130. Changes in average size of farms from 1880 to 1890.[29] (Based on Table XXXVI)

[29] The sign + means increase and — means decrease during decade. Counties left blank underwent some change of boundary.

gained more than twice as fast as the country population, indicating the more extended use of machinery. The most rapid increases were, however, in swine and milch cows, both due to the development of the dairy industry (Items 64-77).

The reports of animal products bring out some of these changes still more clearly. Thus, the slight increase in wool, taken in connection with the incomplete returns both of sheep and wool in 1880 (footnotes to Items 69, 79), makes it evident that an actual decline had occurred in the sheep industry. Evidently the losses caused by dogs, combined with the rising value of land in some districts, were rendering sheep farming as then carried on, relatively unprofitable. The greatest rates of increase were in factory-made butter and cheese; and this notwithstanding the fact that the census secured reports from only 115 butter and cheese factories in 1890, against 152 creameries and 121 cheese factories (273 in all) whose exact locations and owners were definitely stated by the State Dairy and Food Department (Fig. 127). For this year, as for 1880, the federal census of butter and cheese factories was evidently so fragmentary as to be far less reliable than the state statistics. As reported, nearly one fourth of the butter, and more than four fifths of the cheese, were made in factories. The absolute increase of butter was much the greater, but, while butter increased more than five times, cheese increased more than ten times, as fast as the country population. Approximately the same relative increase occurred respectively in eggs and honey, which now began to be items of some importance.

Changes in size of farms, 1880-1890

During the decade 1880-1890 the average size of farm in Minnesota increased 14.6 acres. This increase was somewhat irregularly distributed as appears from Fig. 130.

The most significant feature of this map is the general increase of size in the older counties. In order to get at the reasons for such changes a table is presented dealing with the thirteen counties which lost country population.

TABLE 12—CHANGES IN AREAS AND VALUES IN COUNTIES SHOWING A DECREASE OF COUNTRY POPULATION, 1880 TO 1890

County	Percentage of decrease in country population	Percentage change in number of farms	Percentage change in area of all farm land	Percentage change in average size of farm	Percentage change in average value of farm products per acre of all farm land	Percentage change in average value of farms per acre	Percentage which value of farm products was of total value of farms	
							In 1880	In 1890
Dakota	—10.4	—4.9	—1.3	+3.9	—20.7	+51.3	22.9	12.0
Dodge	—0.5	—7.3	—2.0	+5.8	—22.5	—8.2	23.3	19.7
Fillmore	—8.8	—7.0	—4.2	+3.2	—19.0	+8.8	24.4	18.2
Goodhue	—9.5	—3.5	+4.3	+8.2	—42.9	—12.4	25.1	16.3
Hennepin	—18.9	+4.8	—1.3	—5.8	+6.7	+114.4	19.8	9.9
Houston	—11.9	—4.2	—1.2	+3.2	—26.6	+13.8	28.8	18.6
Mower	—3.7	—5.0	+6.5	+12.1	—11.9	+2.3	27.2	23.5
Olmsted	—12.0	+45.8	—4.8	—34.7	—24.0	—3.3	25.0	19.7
Ramsey	—3.9	—2.7	+1.5	+4.3	+113.2	+285.9	15.9	8.8
Rice	—4.6	+6.0	+0.03	—5.7	—10.4	+19.9	22.1	16.5
Scott	—2.2	+0.14	+0.38	+0.32	—23.0	+26.0	24.7	15.1
Wabasha	—0.1	—10.9	—3.4	+8.4	—17.7	—4.7	29.7	25.7
Winona	—9.7	—14.2	+0.9	+17.6	—15.3	+5.0	28.0	22.6

Along with the decrease in country population there was in most of these counties a decline in the number of farms and an increase in the average size of farms. In some there was even a loss in the total farm acreage, due presumably to the extension of roads and towns, and possibly in some cases to the abandonment of some of the poorer lands.

These relations did not, it is true, obtain in all the thirteen counties; but the most striking exception, Olmsted County, is due to an evident error in the census which can not now be eliminated. The various figures for that county are entirely inconsistent with one another and also with those for all adjacent counties. Such revolutionary changes as the reduction of farms in area by a third do not happen in ten years in a well-settled county, especially when no similar movement is evident in the neighboring territory.

Changes in values of farms and farm products

The total value of farm products rose 44 per cent, the value of farms 75.5 per cent, and the value of live stock 80.9 per cent, compared to an increase of 30.4 per cent in country population. It follows that both the production and the accumulation of wealth outran the increase of country population; and while it is true that these margins were not wide, they show that the tide had turned, since farmers were on the average more prosperous at the end than at the beginning of the decade. This change may reasonably be attributed to the influence of improved farm machinery, the new milling processes, and the dairy industry.[30]

When it comes to a comparison of values with land areas, the matter becomes more complex. A part of the increase in farm values was due to mere increase in acreage, which amounted to 39.2 per cent. If it could be assumed that the new land taken into farms averaged as high in value as land previously occupied, it would follow that 39.2 per cent of 75.5 (or 29.59 per cent) would have to be subtracted in order to ascertain the rate of increase in value of land previously farmed. This assumption is, however, unsafe because the new land was presumably less valuable per acre than land in the older counties. Such additions, while increasing the aggregate value, would normally tend to "dilute" or reduce the average value of the older lands. It therefore becomes important to know what changes occurred in average values per acre (Table 13).

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[30] It has, however, been pointed out by census officials that all figures for values before 1900 must be used with caution, being based more largely on estimates. (Coulter, J. L., in *Quarterly Journal of Economics*, November, 1912).

TABLE 13—AVERAGE VALUES PER ACRE[31]

Items	1880	1890	Absolute increase or decrease	Percentage of change (— denotes decrease)
I. Average value of farms per acre of all farm land......	$14.454	$18.220	$3.766	+26.06
Average value of farms per acre of improved land.....	$26.733	$30.559	$3.826	+14.31
Percentage of farm land improved..................	54.07	59.62	5.55	+10.27
II. Average value of farm products per acre of all farm land	$3.691	$3.817	$0.126	+ 3.42
Average value of farm products per acre of improved land..	$6.826	$6.402	—$0.424	—6.22

According to Table 13 improved land increased faster than total farm land; and while the value of farm products per acre increased 3.42 per cent for all land, it decreased 6.22 per cent for improved land. In other words, during the decade 1880-1890 as from 1870 to 1880, the increase in improved land did not proportionately raise the financial returns. This is the more difficult to explain because the crop season of 1889, represented in the census of 1890, was more favorable than the season of 1879. In the case of wheat, for example, the yield per acre was some four bushels or 35 per cent greater in 1889 than in 1879; though this was in part offset by a slightly lower price (Figs. 71, 102, 75). Moreover, the proportion of improved land under tillage was larger in 1889 (64.64 per cent) than in 1879 (61.49 per cent) as appears from Table 14, which renders the problem still more difficult of solution.

TABLE 14—RATIOS BETWEEN TOTAL, IMPROVED, AND TILLED LANDS[32]

Year	Percentage which improved land was of total in farms	Percentage which tilled land was of total in farms	Percentage which tilled was of improved land
1850..	17.44	....	....
1860..	20.51	15.98	77.89
1870..	35.81	26.61	74.29
1880..	54.07	33.25	61.49
1890..	59.62	38.54	64.64
1900..	70.26	49.31	70.18
1910..	70.98	46.03	64.85

From these facts it follows that, in spite of the larger yield of wheat, there must have been either a smaller product relative to the improved land, taking all branches of agriculture together, or a reduction in the average price of farm products. It is well known that the general level of prices did decline somewhat from 1873 to about 1897; and this fact may be a sufficient explanation of the smaller value of products per acre of improved land. However, several causes also tended to a smaller actual product per acre. Thus there was some deterioration in lands previously farmed for many years under the one-crop system; the margin of cultivation was presumably descending to poorer lands, or at least lands requiring more time to become fully productive, as larger and larger areas came into use; finally, the ratio of country population to improved land was constantly falling (Fig. 218). As each man spread his labor over more and more land, the normal result, under the law of diminishing returns, would be a larger yield per man but a smaller yield per acre, and this seems to have been substantially what happened.

On the other hand, the average value of farms rose 14.31 per cent per acre of improved land, and 26.06 per cent per acre of all farm land. There was thus a disproportionate increase of farm values in the face of decreasing returns per acre of improved land. Referring again to Table 12, relating to counties which declined in country population, it is noteworthy that in all of them except two the value of farm products per acre of farm land declined materially, the two exceptions being Hennepin and Ramsey, in which market gardening and other suburban uses of the land had acquired some importance. Moreover, in all these counties, without exception, the value of farm products of 1889 formed a smaller proportion of the value of farms than did the value of the products of 1879. At the same time, the average acre value of farms increased in nine out of the thirteen counties.

Some of these irregularities may be due to the fact that this was the section of the State which had been ravaged by chinch-bugs for the longest period, and that some counties had made greater progress than others toward the adoption of mixed farming. Further, the proximity of large cities had unmistakably resulted in a speculative advance in land values in Ramsey, Hennepin, and Dakota counties; and this same speculative influence was presumably at work in the vicinity of other important centers of population. On the whole, however, the fact that in all thirteen counties, as in the State at large, the value of farm products represented a smaller percentage of the value of farms than ten years before, and the further fact that the same tendency appeared during the decade 1870-1880 (Fig. 208), raises the question whether the fundamental cause in this advance of land values was not the decline in the rate of interest current in the State which accompanied the increase of population, the accumulation of capital, and the establishment of better credit with eastern money lenders. Certainly nothing but capitalization at a lower interest rate would enable the relatively reduced returns permanently to support such enhanced land values; unless, indeed, the ratio of net to gross farm income was increasing, which could not well happen during a period of falling prices.

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[31] Computed from Table 17.

[32] Tilled land from *Statistics of Minnesota* for 1860 and 1870; other figures from the census.

Weather and crop yields, 1890-1900

The period from 1887 to 1893 was marked by relatively warm winters and cool summers (Figs. 100, 101). Thereafter, the summer temperature rose, though with many fluctuations, reaching the highest points (since 1881) in 1894 and 1900. Precipitation, on the average, increased from the low level of 1889 during the rest of the decade. There were, however, sharp and disastrous fluctuations, especially in the summers of 1893 and above all 1894, when the rainfall was approximately two inches. During these dry seasons, especially in 1894, chinch-bugs again became destructive, particularly in the forested districts where they could find good shelter in winter[33] (Fig. 131).

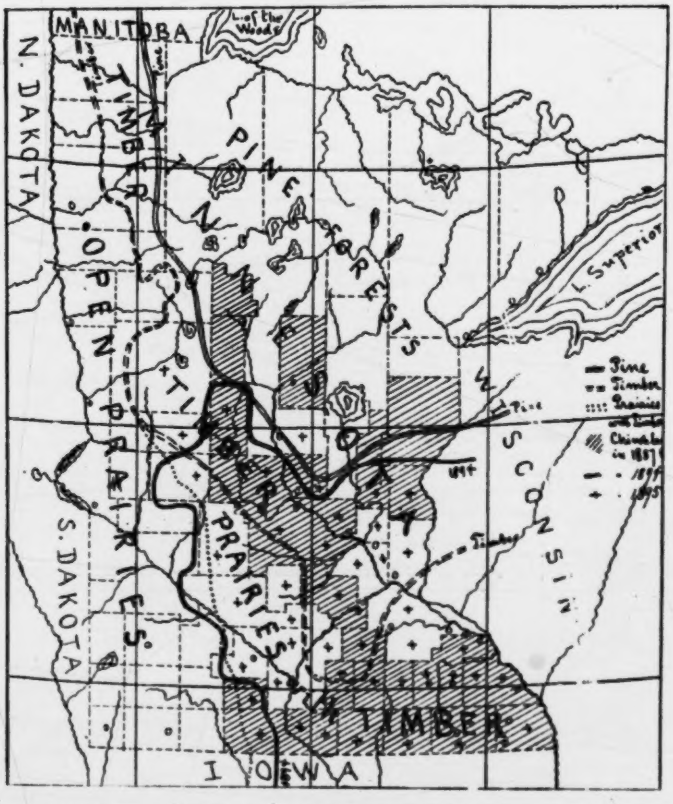

Figure 131. Distribution of chinch-bugs in 1887, 1894, and 1895.[33]

In consequence of these conditions as to weather and insects the average yield of wheat was low in seven of the nine years up to 1898, when the series of state statistics unfortunately comes to an end (Fig. 102). In 1892 the crop averaged only 11.8 bushels, in 1893 only 10.7 bushels, and in 1897 only 9.11 bushels per acre, thus falling below 10 bushels per acre for the first time since 1876 (Fig. 71). The seasons of 1891 and 1895, on the other hand, gave yields exceeding 18 bushels per acre. Other products varied somewhat, but in general were unfavorably affected in the same years and by the same conditions as wheat.[34]

Wheat prices, 1890-1900

The price of wheat continued on the whole to work lower until 1894; the last drop following the memorable panic of 1893, which diminished seriously the buying power of large classes of the population (Fig. 75). After the short crops of 1892, 1893, and 1894 a sharp rise again set in which culminated in 1898. The price of wheat in 1899 and 1900, though low relative to that in 1898, was nevertheless in advance of its price in 1893 and 1894.

The actual acreage in wheat rose in 1890 as compared to 1889, following the advance in wheat prices during the first quarter

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[33] *Ann. Rept. Agr. Exp. Sta.*, 1895, 97-123.
[34] *Ann. Rept. Comr. of Statistics*, 1896, 8.

Acreage in various crops, 1890-1900

of the year (Fig. 103). Again in 1892, after the good crop of 1891, there was a further increase which carried the acreage to the highest point recorded since 1886. With the poor crops of 1892 to 1894 the acreage again shrank, but rallied somewhat in 1895 and 1896, by reason of the slightly better yield in 1894 as compared to 1893, and the upward trend of prices which began in 1896.

In consequence of these generally unfavorable circumstances wheat lost ground relatively during the first half of the decade. In 1889 it had occupied 45.89 per cent of all tilled land;[35] in the following years, especially in 1890 and 1892, it regained some of the lost ground, but in 1895, after the low prices and poor yields of 1893-94, it held only 39.3 per cent of the tilled land. From 1878 to 1895 the proportion of land in wheat had thus declined substantially one half.

The same circumstances tended in a measure to check the increase of tilled land, as shown by Fig. 132.

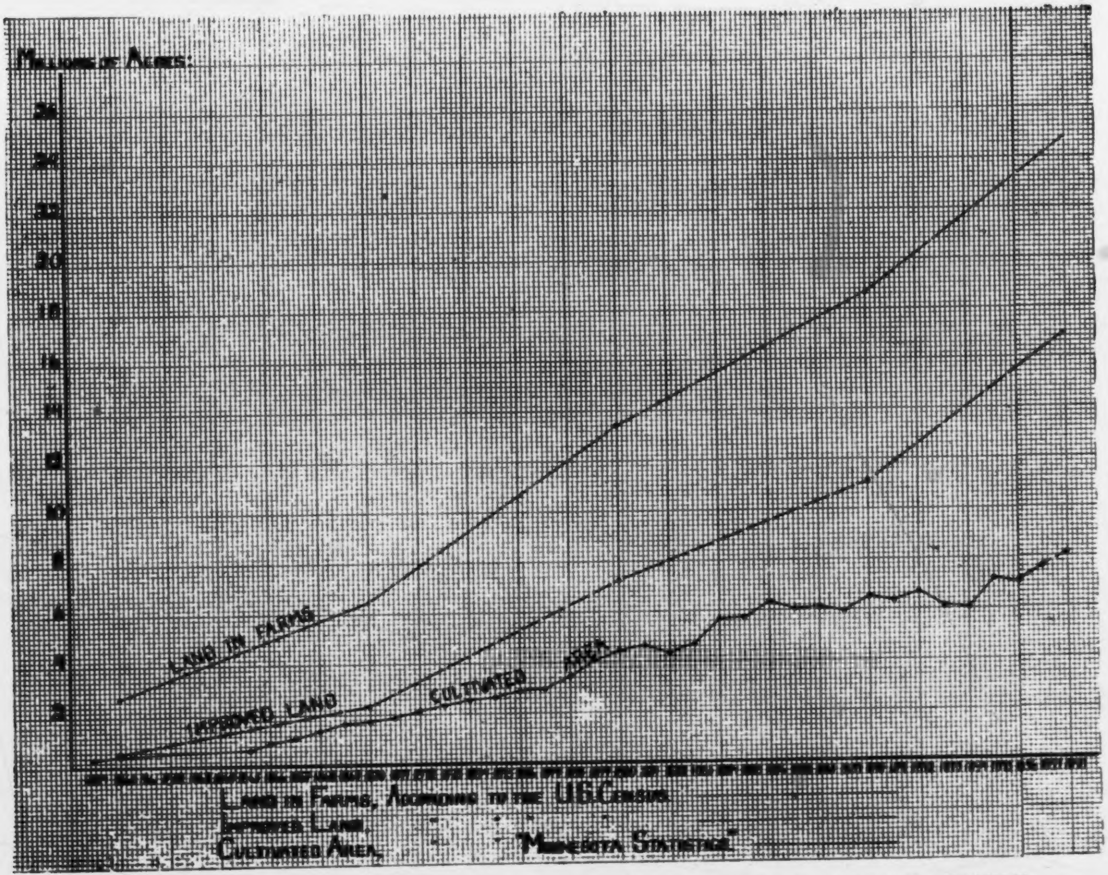

Figure 132. Increase of land in farms, land improved, and land cultivated, in Minnesota, 1859-1898.[36]

In this diagram it is noticeable that, after 1884 and especially after 1890, the margin between the tilled land reported by the state statistics and the improved land reported by the census began perceptibly to widen. In a measure, however, this widening may have been due to the break in wheat prices in 1884, which led some of the farmers to underestimate their tilled acreage. The relative loss of acreage in wheat from 1889 to 1895 was offset chiefly by the increase of corn and barley, the two gaining almost exactly the percentage lost by wheat. After the good wheat crop of 1895, especially in view of the advancing prices, more land was planted to wheat, year by year, the proportion of tilled land under that crop being thus raised from 38.91 per cent in 1895 to 47.75 in 1898. The extremely high price of wheat in the latter year resulted in another large addition to the acreage in 1899. The census of 1900, based on the 1899 crop season, thus reported 6,560,707 acres or 50.69 per cent of the tilled area in wheat, compared to 2,790,782 acres or 38.91 per cent in 1895.

This acreage marked another, and no doubt the last, culminating point of wheat culture in Minnesota; since the proportion of tilled land then reported in wheat was larger than in any year, so far as recorded, after 1886 (Fig. 104). Such an apparent relapse into specialized wheat farming caused great uneasiness in the State, as evidenced by books and other publications of the period.[37] In point of fact, however, as will appear from the distribution maps, this relapse into wheat growing was due in large part to the extension of tillage over new lands, rather than a return to wheat farming in the older counties (Fig. 135).

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[35] A calculation based on the census of 1890 with additions for certain crops not shown in the census by acres gives 46.89 per cent of tilled land in wheat. This result confirms the substantial accuracy of the state statistics so far as concerns the relative breadth of different crops.

[36] *Statistics of Minnesota*, 1869, 5; 1872, 9; 1880, 21; 1896, 17; 1898, 7.

Changes in animal industries, 1890-1900

At the World's Fair in 1893 first prizes were awarded to exhibitors from Minnesota for shorthorn cattle and Clydesdale horses.[38] Nevertheless, these successes were due to individual herds rather than to the general excellence of Minnesota live stock. The very next year Professor Thomas Shaw bore witness that beef cattle in Minnesota were not yet, on the average, of sufficiently high grade to render the production of such cattle for the market a profitable industry in competition with cattle from the western ranges.[39]

In this period occurred a series of revolutionary inventions, especially the mechanical separator, which made possible the quick and complete separation of butter fat from the milk; and the Babcock test for the determination by sample of the proportion of butter fat in milk. A separator using centrifugal force was patented as early as 1877;[40] by 1885 one was in use on the farm of Mr. J. J. Hill;[41] and by 1890 this method of separation began to come into general use.[42] At the same time (July, 1890) the Babcock test was given to the world without price.[43] These inventions for the first time put dairying on a scientific basis, and may therefore be compared, in their far-reaching importance, to the new flour milling processes. In 1891, moreover, the School of Agriculture of the State University became very active in connection with dairying. Another event of first-class importance was the introduction of the coöperative creamery. Hitherto, both cheese factories and creameries had been private concerns, operated for the benefit of their proprietors. In 1889, however, a coöperative cheese and butter factory was established at Biscay, McLeod County; and in May, 1890, a group of Danish farmers at Clark's Grove, Freeborn County, inspired by the story of coöperation in Denmark, organized the first separate creamery on the basis of ownership by the patrons.[44] This establishment became the model for many others, especially as the entire influence of the Dairy School at the University was cast in favor of the coöperative form of organization.

The Babcock test, the power separator, the introduction of refrigeration and of coöperative organization all favored the transfer of butter-making from the farm to the factory. This accordingly took place with great rapidity during the early nineties (Fig. 134). In order to shorten the haul for patrons, skim stations were also established in outlying districts, where separators were installed, only cream being forwarded thence to the creamery. In the face of these revolutionary advances in butter-making, cheese factories soon began to decline, both relatively and absolutely. The period from about 1890 to 1895 or 1896 was thus the climax of cheese-making in Minnesota.[45]

The relative localization of these two branches of the dairy industry seems to have been affected to some extent by the nationality of the settlers; the Swiss bringing the traditions of cheese-making and the Danes favoring butter (Fig. 133). At all events, Freeborn County, which contained by far the largest settlement of Danish farmers, early became the leading butter county;[46] while Dodge and Goodhue, containing the largest Swiss colony outside of the cities, have maintained an even more striking lead in the production of cheese[47] (Table XXXII).

In the northwestern cheese district, comprising Red Lake and Polk counties, French settlers have been active in cheese manufacture,[50] and it is possible that old-country traditions have likewise played a part.

Distribution of crops according to the census of 1900

Wheat growing, whether tested by acreage or yield (Figs. 135, 136), had perceptibly migrated toward the west and northwest. In the southeast it was unimportant, except in Goodhue and the counties immediately west which were decreasing in population. On the other hand, the area of greatest density lay in the upper Minnesota Valley and the belt of heavy land extending south from the big bend of the Minnesota. Next to these districts, the principal wheat-growing area was the Red River Valley.

Oats continued to be produced in all the agricultural counties, chiefly for local use. In addition, there were two districts where this grain had practically replaced wheat as a market crop: one in Dakota County, adjacent to the great cities, the other in Fillmore and Mower counties, where the southeastern plateau reaches the greatest elevation (Figs. 137, 138).

Barley spread northward during the decade, becoming of some importance in all the Red River counties. In the main, however, barley growing was concentrated in two separate districts: one in the extreme southwest on and south of the Coteau des Prairies, the other including five counties in the southeast, east of Steele and north of Mower and Fillmore. In these counties barley had largely replaced wheat as a market crop, possibly in part because of the local markets offered by the breweries in La Crosse and other towns on the Mississippi; but in the main because barley yielded better than wheat on lands somewhat depleted by the one-crop system. Such lands are sometimes preferred for barley because it is less likely to run unduly to stalk and to "lodge" under heavy winds and rain. Of the several counties Olmsted and Wabasha led in barley, as Mower and Fillmore did in oats.

The principal rye-growing district overlapped the barley district in Goodhue County, but for the rest lay farther north, extending from Dakota to Sherburne and Isanti counties. The larger part of the crop, indeed, was on the lighter soils, adjacent to and east of the Mississippi (Figs. 141, 142).

Corn had advanced a little toward the north, but in the main was confined to the southern third of the State, as was the case in 1890 (Figs. 143, 144). Within that area, however, corn had gained considerable ground. The area of greatest density of

[37] Latzke, Paul, *The Predicament of Minnesota* (St. Paul, 1904).
[38] *Ann. Rept. Comr. of Statistics*, 1893, 142.
[39] *Report of State Agricultural Society*, 1894, 77.
[40] Wing, Henry H., *Milk and Its Products* (New York, 1913), 112.
[41] Seventh Report Minnesota Dairymen's Association, 1885.
[42] *Report Delaware Exp. Sta.*, 1892, 110-122; also Bul. 17.
[43] Wis. Exp. Sta., Bul. 24, July, 1890.
[44] Vye, J. A., *The Story of the Birth of a Great Coöperative Movement.*
[45] *Seventh Biennial Report Dairy and Food Dept.*, 162-163.
[46] Excluding counties containing centralizers.
[47] Table XXXII. Compare *Ninth Biennial Report Dairy and Food Dept.*, 35
[48] Statement of State Dairy Commissioner.

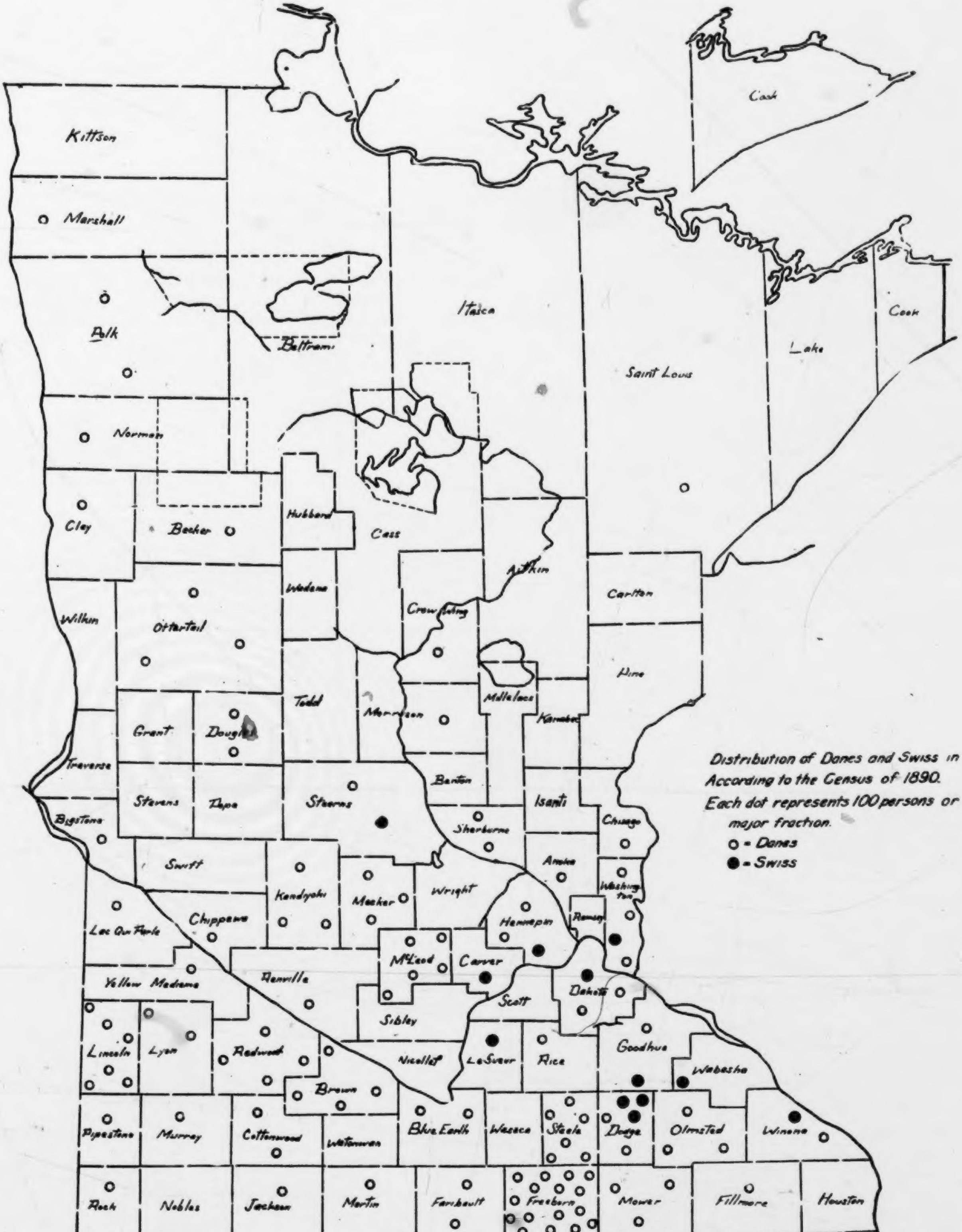
Distribution of Danes and Swiss in Minn.
According to the Census of 1890.
Each dot represents 100 persons or major fraction.
○ = Danes
● = Swiss
Kittson
Marshall
Polk
Beltrami
Itasca
Saint Louis
Lake
Cook
Norman
Clay
Becker
Hubbard
Cass
Wadena
Crow Wing
Aitkin
Carlton
Wilkin
Ottertail
Todd
Morrison
Mille Lacs
Kanabec
Pine
Grant
Douglas
Traverse
Stevens
Pope
Stearns
Benton
Isanti
Chisago
Big Stone
Sherburne
Anoka
Swift
Kandiyohi
Meeker
Wright
Washington
Lac Qui Parle
Chippewa
Hennepin
Ramsey
McLeod
Carver
Yellow Medicine
Renville
Dakota
Scott
Sibley
Lincoln
Lyon
Redwood
Goodhue
Nicollet
Le Sueur
Rice
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
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Figure 133. Distribution of Danes and Swiss outside the three large cities according to the census of 1890.[49]

[49] Excluding 355 Swiss reported for Isanti in 1890. The census showed only two Swiss there in 1900 and seven in 1910. Evidently some enumerator in 1890 confused "Swiss" with "Swedes."

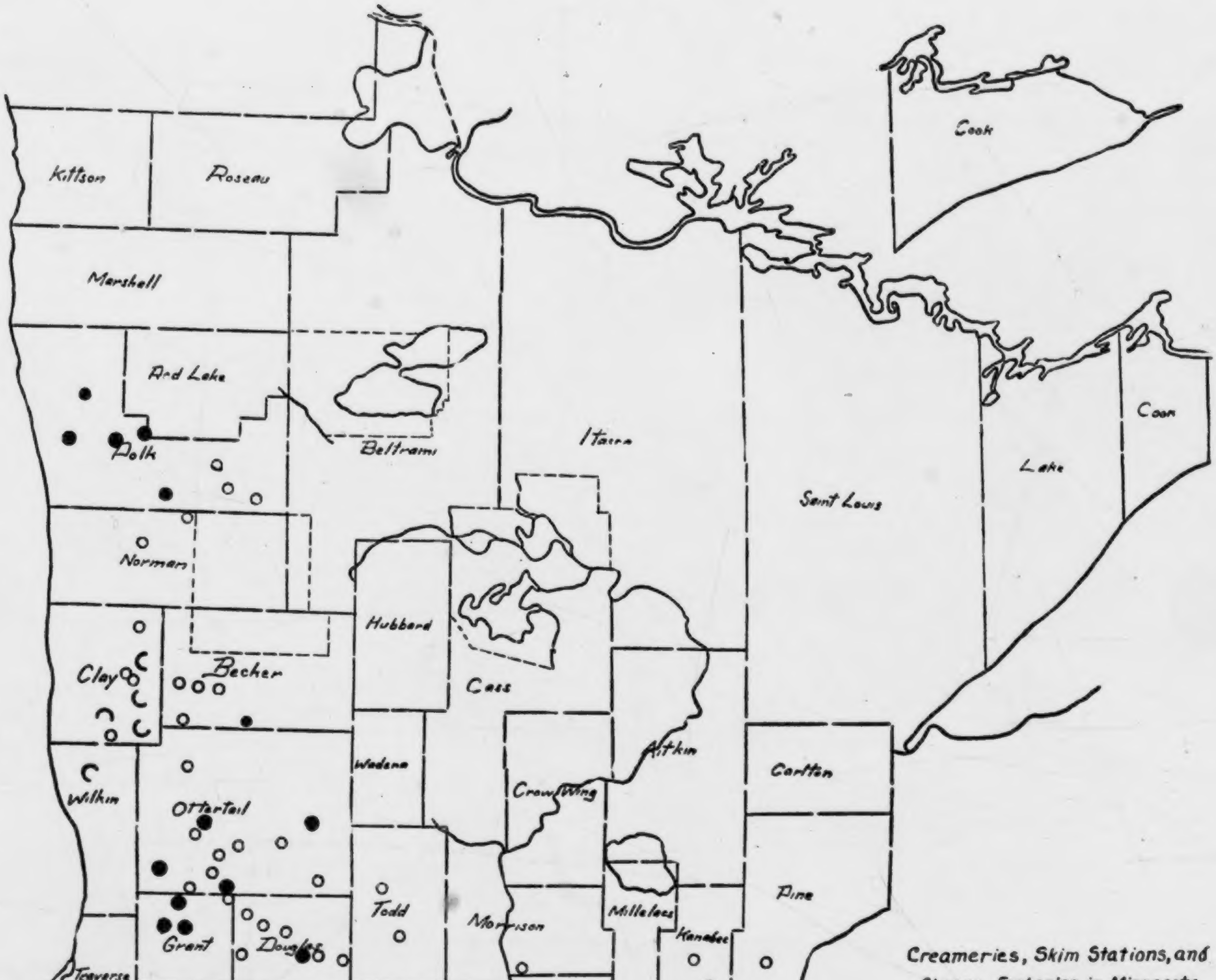
Kittson
Roseau
Cook
Marshall
Red Lake
Polk
Beltrami
Itasca
Saint Louis
Lake
Cook
Norman
Hubbard
Clay
Becker
Cass
Wilkin
Ottertail
Wadena
Crow Wing
Aitkin
Carlton
Todd
Morrison
Mille Lacs
Pine
Kanabec
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Big Stone
Sherburne
Swift
Anoka
Washington
Kandiyohi
Meeker
Wright
Lac Qui Parle
Chippewa
Hennepin
Ramsey
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Lincoln
Lyon
Redwood
Sibley
Goodhue
Nicollet
Le Sueur
Rice
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Creameries, Skim Stations, and Cheese Factories in Minnesota in 1896
○ = one creamery
∩ = one skim station
● = one cheese factory

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Figure 134. Creameries, skim stations, and cheese factories in 1896.[60]

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[60] Report of State Dairy Commissioner, 1896, map.

corn growing included the southern tier of counties, and the lower Minnesota Valley. The leading corn county at the census of 1900, all things considered, was Fillmore, originally and for many years the leading wheat county; although it led in corn by a smaller margin than Mower did in oats or Olmsted in barley.

The production of potatoes was naturally well distributed, owing to the universal use and bulky nature of this crop (Figs. 145, 146). In addition, two areas of specialized potato culture appeared; one near the large cities, extending from Dakota to Isanti and Chisago counties; the other in Clay County in the Red River Valley. The character of the industry was, however, essentially different in the two areas. The potato belt near the cities coincided almost exactly with the principal rye district, since both crops do well on sandy soils not suited to most cereals. Besides supplying the city market, this district also furnished potatoes for shipment to the East as previously noted (p. 111). In Clay County, on the other hand, Early Ohios were grown for shipment to states further south as seed potatoes. This industry owed its establishment to individual initiative, Mr. Henry Schroeder being the pioneer potato grower of that region.[51] It is, however, based on the fact that northern-grown seed give better results than seed native to the southern locality where used.

Flax was extensively grown for seed in two principal districts (Figs. 147, 148): one, the southeastern counties which had abandoned or were in process of abandoning the one-crop system, where flax divided the ground with oats, barley, and corn; the other district in the newer prairie counties extending from south to north along the western boundary of the State, where flax was still in part a sod crop.

The hay crop, including both wild and tame, was coextensive with the zone of agricultural settlement and even lapped over into the lumbering region. The distribution of tame hay was less even, the bulk of the acreage being in the counties south and east of Stearns County (Figs. 149, 150). Considerable areas were, however, planted to tame hay in all except the northern tier of counties in the Red River Valley. This fact indicates a great advance of diversified farming since 1890 (Figs. 125, 150).

Distribution of the dairy industry in 1900

Dairy cattle, like the hay crop, were distributed over the entire agricultural zone (Fig. 151). There were, however, two areas of greater than average density: one in Freeborn and adjacent counties in the south central district, which led in butter production; the other in the counties lying west of the Twin Cities, where milk was to some extent produced for the city markets and for the large creameries or "centralizers" located there. East of the Mississippi the dairy industry had made progress adjacent to the cities, but on the whole far less than would have been expected in view of the favorable location of this district and the fact that the soil there is better suited to grass and root crops than to grains. This relative retardation was presumably due to the general preference in recent decades for prairie over forested lands.

The census of 1890 unfortunately continued to combine creameries and butter factories, reporting 596 of both classes but without definite indication as to their location. The census was evidently incomplete on this point, as it had been previously, since the State Dairy and Food Department gave the location and owner of 664 creameries and 90 cheese factories in 1898, two years before the census, and in 1901 reported in like manner 681 creameries and 73 cheese factories, a total of 754 (Fig. 152). The substantial accuracy of this figure is confirmed by the census of manufactures for 1904 which, for the first time, made a careful report on the dairy industry in Minnesota, giving 771 creameries and cheese factories.

Distribution of improved land according to the census of 1900

In 1900 seven counties in the two southern tiers and two in the Minnesota Valley had between 80 and 90 per cent of their entire land area improved; all the others west of the Mississippi and south of Grant County had from 60 to 80 per cent improved, except several fronting on the Mississippi and lower Minnesota. In these the bluffs and marshy bottoms interfere with full cultivation. It is noticeable that Rock County, in the extreme southwestern corner, had over 80 per cent, while Houston and Winona counties, in the rolling driftless area, had less than 60 per cent of improved land. East of the Mississippi only Washington County was in the 60 per cent class. In fact, nearly all the region east of the Mississippi had less than 5 per cent of its area improved (Fig. 153).

From Fig. 152 it is clear how widely the dairy industry had spread, even in the Red River Valley, and also how far the output of butter exceeded that of cheese. The principal center of cheese production was still in Dodge and adjacent counties, with scattering factories elsewhere. These were relatively most numerous in the Park region and the Red River Valley, probably because a larger number of cows is necessary to support a creamery than a cheese factory. This fact gives the cheese industry a certain advantage in new dairy districts.

Distribution of value of products in 1900

The immense expansion of agriculture from 1890 to 1900, compared to earlier decades, is nowhere more clearly apparent than in the distribution of value of products (Fig. 154). The entire southern section, and also the Red River Valley, now belonged to the agricultural zone, while the northeastern two fifths of the State still remained almost untouched by the plow. In spite of the rapid spread of agriculture toward the west and northwest the value of products per square mile was greatest in the older section, south and east of Stearns County. The fresh soils of the newer counties were thus more than offset, so far as concerned the financial return per acre, by greater labor applied to the land in the older counties. It should be noted, however, that while this more intensive use of the soil naturally gave larger returns per acre, the returns per man and per team were frequently larger on the newer lands, owing to the increasing cost of production per unit of output under intensive cultivation (page 221).

Distribution of population in 1900

In 1900 the center of density of population was in the counties adjacent to the two great cities, and in the Minnesota Valley counties below the big bend. Settlement had continued to spread in the Red River Valley, occupying the last of the prairie townships; and from there had begun to work eastward into the brush prairies. Except for the strip adjacent to this valley, most of the hardwood belt of the State (Figs. 8, 153) was in farms, though wood-lots still occupied a considerable area. East of the Mississippi scattered clearings appeared along the railroads even in the cut-over and (largely) burned-over coniferous zone, especially between St. Paul and Duluth. This decade was also marked by the development of the Mesabi iron range, and therefore by the appearance of a considerable population, for the most part resident in towns, in St. Louis County (Figs. 155, 156).

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[51] Letter under date of April 14, 1913, from Mr. L. A. Huntoon, President First National Bank of Moorhead.

[52] *Biennial Report of Dairy and Food Dept.*, 1899, map.

If all incorporated places be eliminated, as is done in the map of country population (Figs. 155, 156), most of the apparent settlement in this northeastern region disappears. The coniferous zone stood in 1900 as a great island of wilderness, thinly sprinkled with logging and mining camps and towns, but barely touched as yet by agricultural settlement. On the other hand, the remainder of the State, aside from the center of density west and southwest of the Twin Cities, showed a surprising evenness of settlement. Evidently a dominant type of agriculture, based on substantial equality of soil, had worked itself out in an approximately equal spread of population over the land.

The decrease of country population, noted for the previous decade, continued between 1890 and 1900 in five of the same thirteen counties; though the rate of decrease was less rapid in all of them except Wabasha (Figs. 109, 157). In addition, three counties lying farther west, at the big bend of the Minnesota, suffered a loss of country population. The extent to which the decrease was spread over these counties is shown in Table 15.

TABLE 15.—PROPORTION OF TOWNSHIPS WHICH LOST COUNTRY POPULATION, 1890-1900

County	Total number of townships	Townships reported as losing population	Number of new incorporations	Losses due to new incorporations	Net number decreasing
Blue Earth	23	12	3	2	10
Fillmore	24	9	0	0	9
Goodhue	23	15	1	1	14
Le Sueur	14	5	1	0	5
Nicollet	13	10	2	1	9
Rice	14	6	3	2	4
Wabasha	17	11	5	5	6
Winona	20	14	4	4	10
Total	148	82	19	15	67

An inspection of these figures, and of the list of villages newly incorporated in the several counties, shows that the large apparent decrease in Wabasha was due in great part to the separation of villages not reported as such in 1890; and that the same cause affected the returns from several of the other counties to some extent. On the whole, however, the fact remains that there was an actual loss of population in nearly half of the purely rural townships.

By way of possible explanation it may be pointed out that these eight counties formed a zone in which dairying had made less advance, and more reliance was therefore still placed on grain growing than in Freeborn and the adjacent south central counties (Figs. 149-151, 135-144). The inference would be that dairying gives employment to more people. Some further light is thrown on the matter by an examination of the changes in size of farms. From the map (Fig. 158) it is evident at a glance that the relation of population and size of farms was not uniform, which probably indicates the existence of unknown factors in the problem; but the fact that farms increased in size in six out of the eight counties which lost country population creates a presumption that consolidation of land holdings was a fundamental cause underlying the decrease of population. If it be objected that much greater increases in size of farms occurred in the southwest and west, without a decrease in country population, the answer is that in 1900 there was still unoccupied land in those counties which could be added to farms without ousting anyone; which was not the case in most of the older southeastern counties.

Summary of agricultural changes for the state as a whole, 1890-1900

In order to bring out clearly the extent, rate, and direction of change, the corresponding items for 1890 and 1900 are given in Table 18, at the end of the chapter, with an analysis of the changes on the percentage basis, and also with reference to the rural population.

The country population in the State as a whole increased 25.7 per cent during the decade ending 1900, which was less than the rate (30.4 per cent) in the decade ending 1890. On the other hand, town population increased 43 per cent, compared with 153.5 per cent during the preceding decade. The towns thus slowed down greatly in their rate of increase, but they nevertheless continued to gain faster, both absolutely and relatively, than the open country (Items 1-3).

The total land in farms was augmented by 7.6 million acres or 40.6 per cent during the decade, most of this increase (7.3 million acres) being represented by improved land. While total land in farms increased 40.6 per cent, and improved land 65.7 per cent, the gain in number of farms amounted only to 32.4 per cent. As a result, the average farm was larger by an even 10 acres, or 6.3 per cent, and contained a fourth (25.3 per cent) more improved land (Items 4-9).

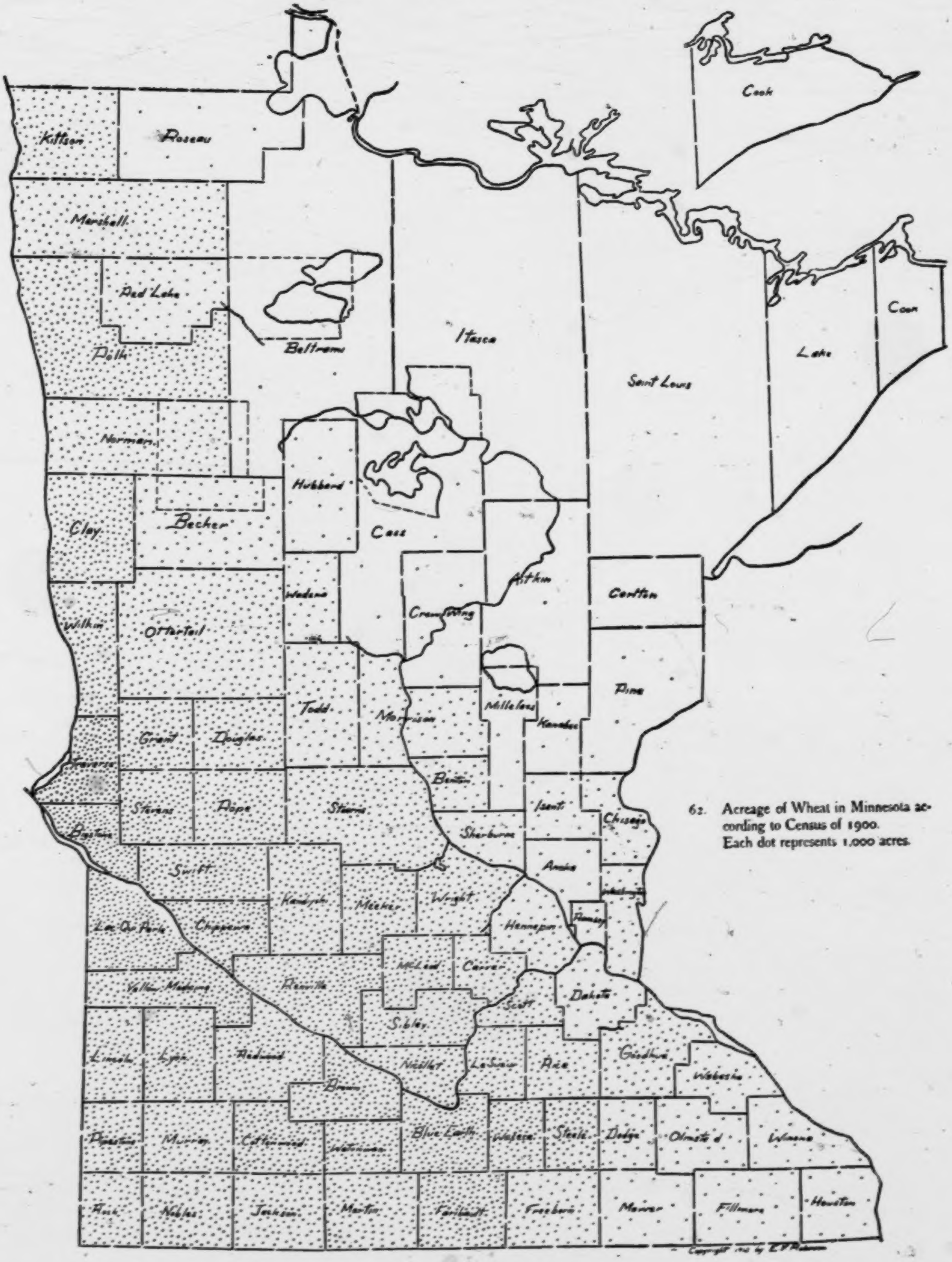
The acreage in wheat almost doubled, the bulk of this increase, as previously noted, being in the last half of the decade; while the production increased less rapidly, the average yield being a bushel per acre lower in 1899 than in 1889.

Rye also showed a larger acreage and smaller average yield, while buckwheat had declined in both respects. On the other

---

[53] *Biennial Report of Dairy and Food Dept.*, 1903, 16, 38.

[54] Roseau and Red Lake counties formed from Kittson and Polk, distributing figures for these counties, which nevertheless showed an increase in population and size of farms.


Kittson
Roseau
Cook
Marshall
Red Lake
Polk
Beltrami
Itasca
Saint Louis
Lake
Cook
Norman
Clay
Becker
Hubbard
Cass
Aitkin
Carlton
Wilkin
Otter Tail
Wadena
Crow Wing
Todd
Morrison
Mille Lacs
Kanabec
Pine
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Big Stone
Sherburne
Anoka
Swift
Kandiyohi
Meeker
Wright
Lac Qui Parle
Chippewa
Hennepin
Ramsey
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

62. Acreage of Wheat in Minnesota according to Census of 1900.
Each dot represents 1,000 acres.

Figure 135. Acreage of wheat in 1899 according to census of 1900. (Based on Table XIII)

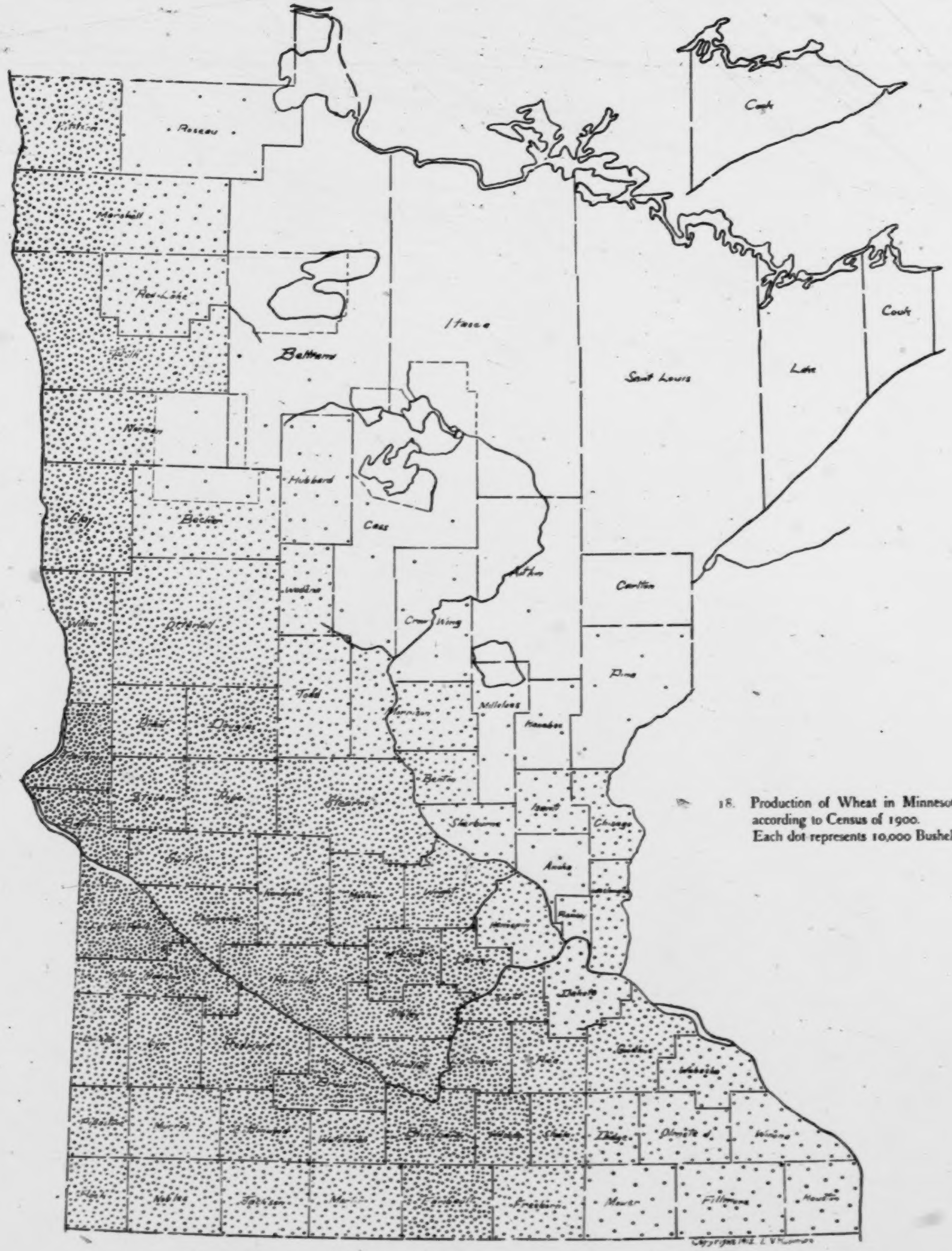
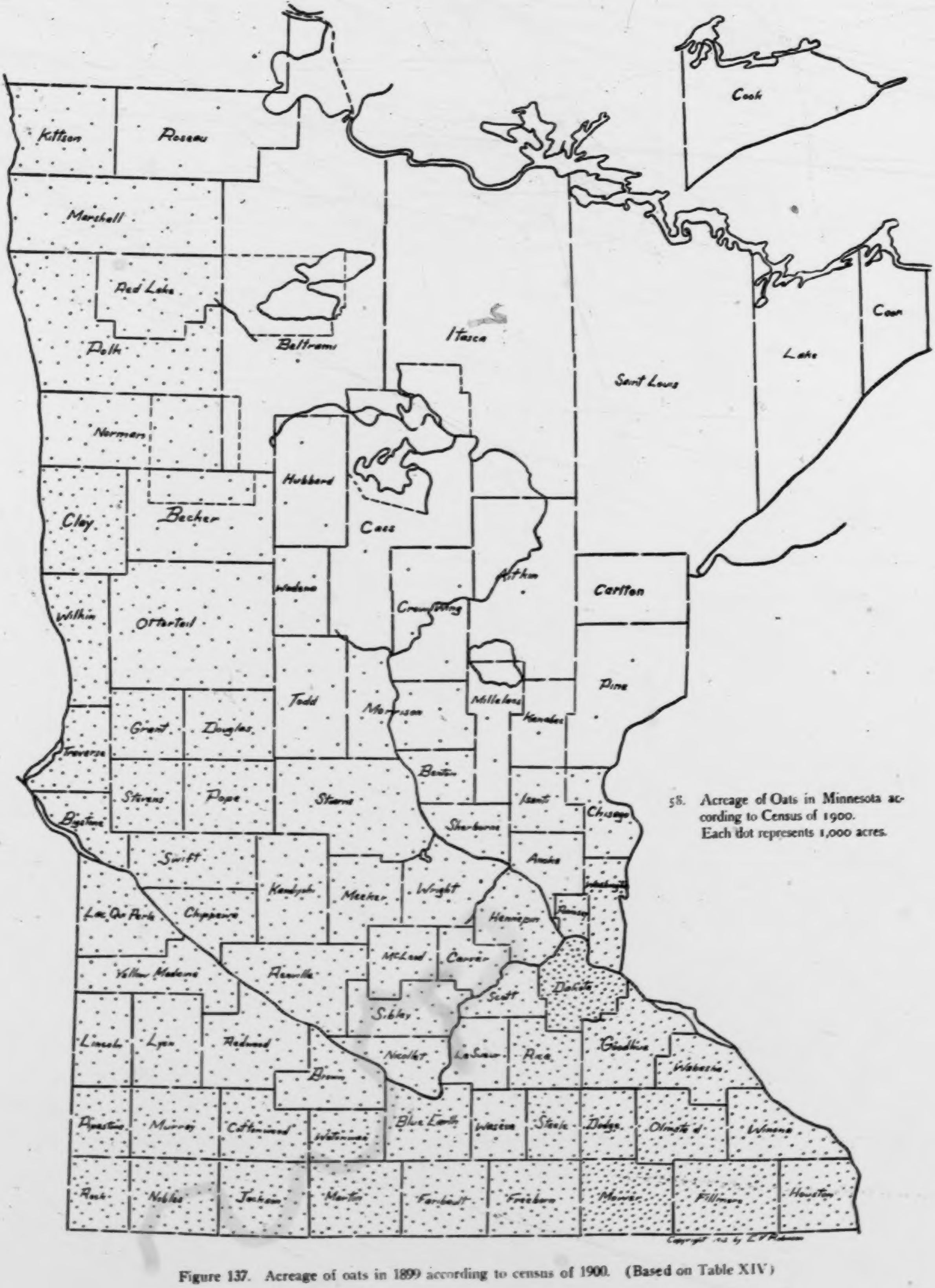
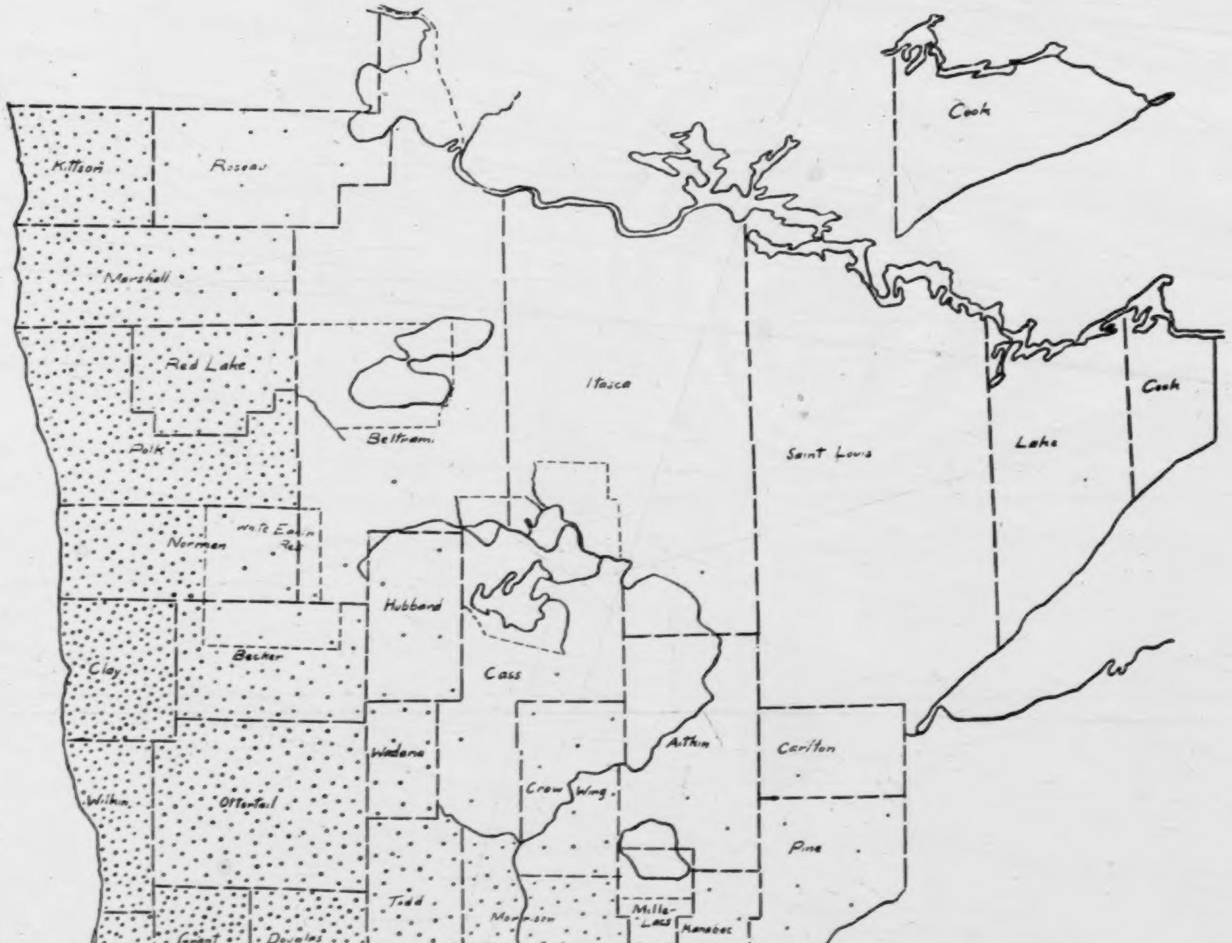

Kittson
Roseau
Marshall
Red Lake
Polk
Beltrami
Itasca
Saint Louis
Cook
Cook
Lake
Norman
Hubbard
Clay
Becker
Cass
Wadena
Crow Wing
Aitkin
Carlton
Otter Tail
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Benton
Stevens
Pope
Stearns
Sherburne
Isanti
Chisago
Anoka
Swift
Kandiyohi
Meeker
Wright
Hennepin
Ramsey
Dakota
Goodhue
Wabasha
Dodge
Olmsted
Winona
Nobles
Jackson
Faribault
Freeborn
Mower
Fillmore
Houston
18. Production of Wheat in Minnesota according to Census of 1900. Each dot represents 10,000 Bushels.

Figure 136. Production of wheat in 1899 according to the census of 1900. (Based on Table XIII)


Kittson
Roseau
Marshall
Red Lake
Polk
Beltrami
Itasca
Cook
Lake
Coon
Saint Louis
Norman
Clay
Becker
Hubbard
Cass
Wadena
Crow Wing
Aitkin
Carlton
Wilkin
Otter Tail
Todd
Morrison
Mille Lacs
Kanabec
Pine
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Big Stone
Sherburne
Anoka
Swift
Kandiyohi
Meeker
Wright
Washington
Lac Qui Parle
Chippewa
Hennepin
Ramsey
Yellow Medicine
Renville
McLeod
Carver
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

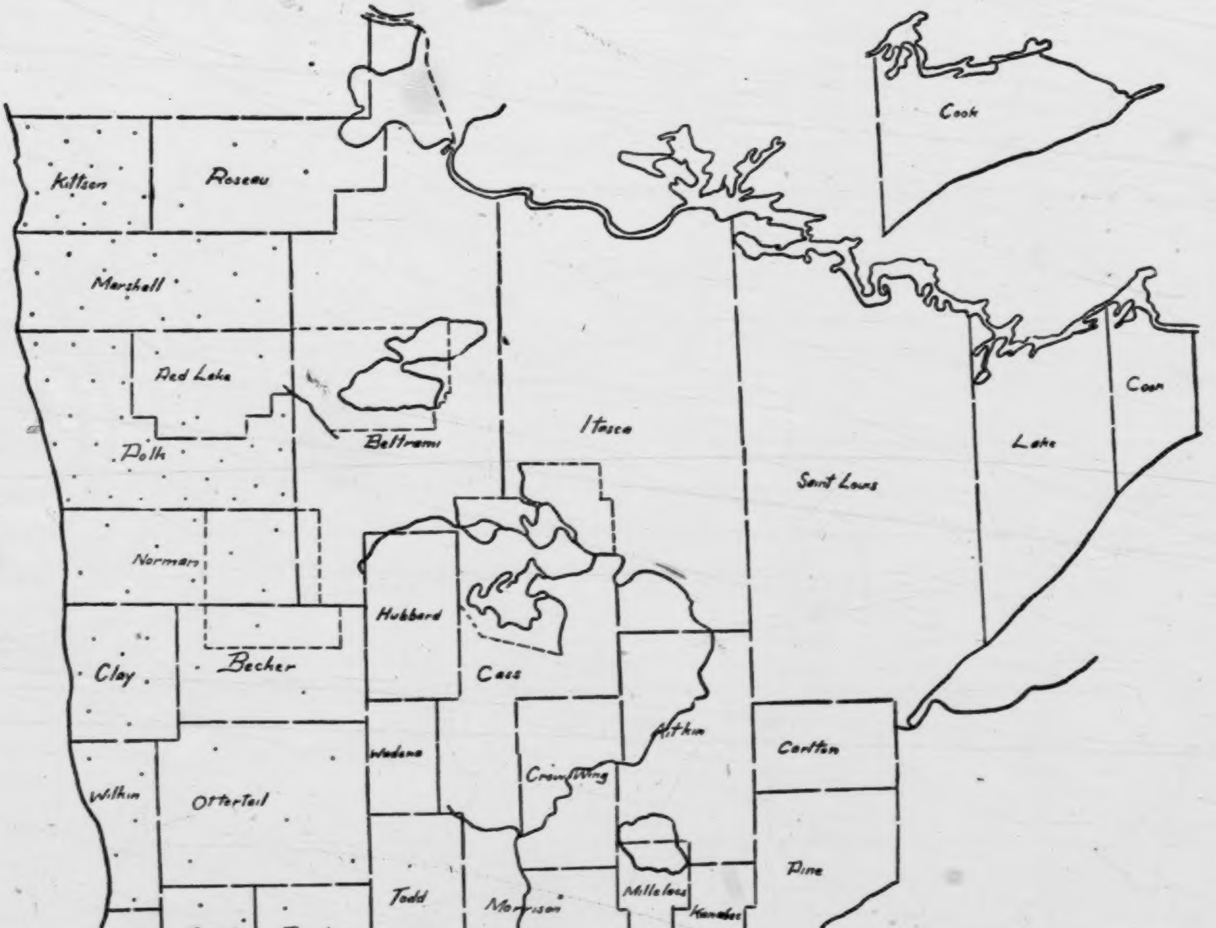
58. Acreage of Oats in Minnesota according to Census of 1900.
Each dot represents 1,000 acres.

Figure 137. Acreage of oats in 1899 according to census of 1900. (Based on Table XIV)


Cook
Kittson
Roseau
Marshall
Red Lake
Polk
Beltrami
Itasca
Saint Louis
Cook
Lake
Norman
White Earth Res
Hubbard
Clay
Becker
Cass
Wadena
Aitkin
Carlton
Wilkin
Ottertail
Crow Wing
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Big Stone
Sherburne
Swift
Anoka
Kandiyohi
Meeker
Wright
Hennepin
Lac Qui Parle
Chippewa
McLeod
Carver
Renville
Yellow Medicine
Scott
Sibley
Goodhue
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Steele
Winona
Jackson
Martin
Faribault
Freeborn
Houston

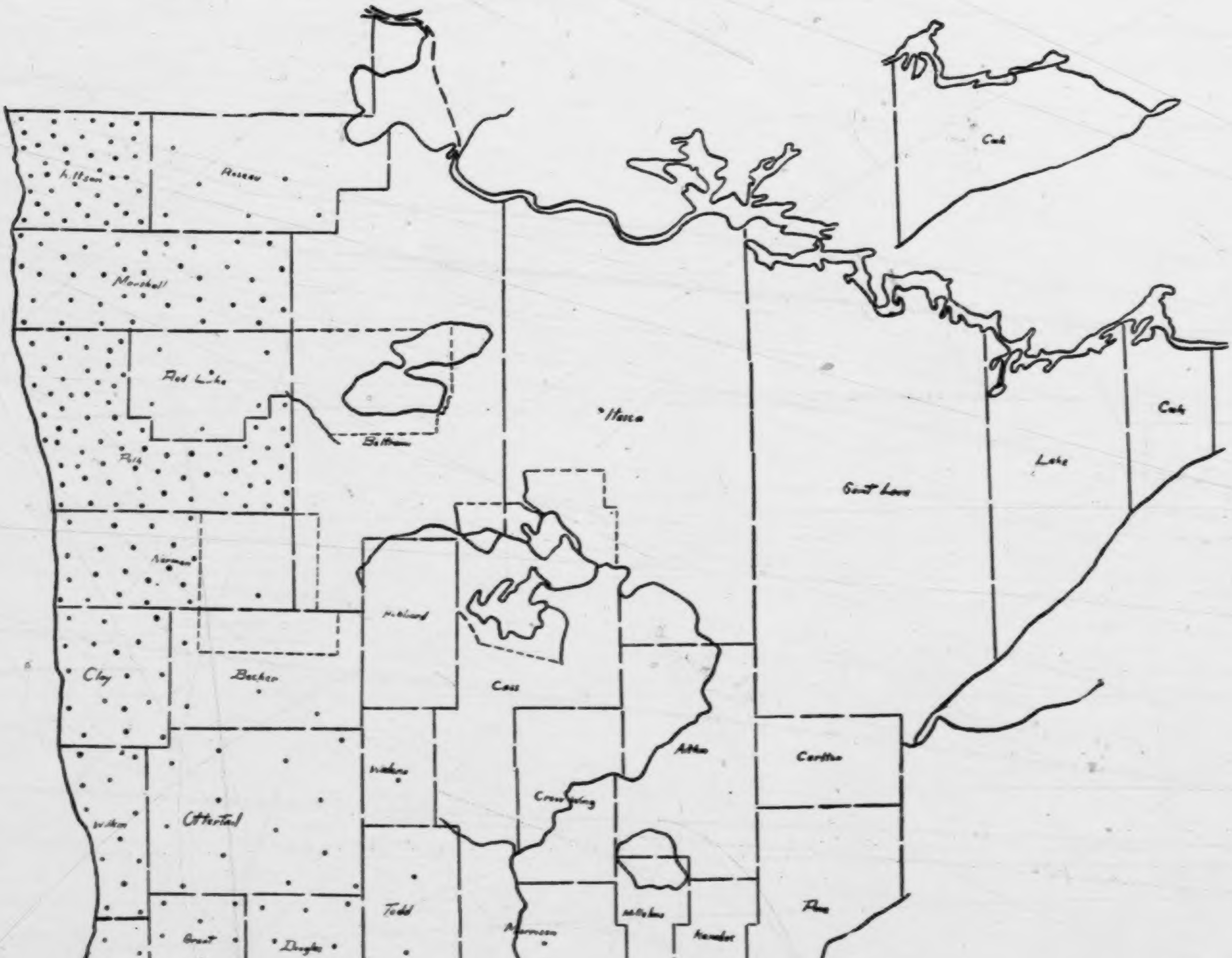
30. Production of Oats in Minnesota according to Census of 1900. Each dot represents 10,000 Bushels.

Figure 138. Production of oats in 1899 according to census of 1900. (Based on Table XIV)


Kittson
Roseau
Marshall
Red Lake
Polk
Beltrami
Itasca
Cook
Lake
Cook
Saint Louis
Norman
Clay
Becker
Hubbard
Cass
Wilkin
Otter Tail
Wadena
Crow Wing
Aitkin
Carlton
Pine
Grant
Douglas
Todd
Morrison
Mille Lacs
Kanabec
Traverse
Stevens
Pope
Stearns
Benton
Isanti
Chisago
Big Stone
Sherburne
Swift
Anoka
Kandiyohi
Meeker
Wright
Washington
Ramsey
Hennepin
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Goodhue
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

50. Acreage of Barley in Minnesota according to Census of 1900.
Each dot represents 1,000 acres.

Figure 139. Acreage of barley in 1899 according to the census of 1900. (Based on Table XVI)


Kittson
Roseau
Marshall
Red Lake
Beltrami
Polk
Norman
Itasca
Cook
Lake
Saint Louis
Clay
Becker
Hubbard
Cass
Aitkin
Carlton
Wadena
Wilkin
Ottertail
Crow Wing
Todd
Morrison
Mille Lacs
Kanabec
Pine
Grant
Douglas
Traverse
Stevens
Pope
Stearns
Benton
Isanti
Chisago
Big Stone
Sherburne
Swift
Kandiyohi
Meeker
Wright
Anoka
Washington
Ramsey
Hennepin
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Brown
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

36. Production of Barley in Minnesota according to Census of 1900. Each dot represents 10,000 Bushels.

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Figure 140. Production of barley in 1899 according to census of 1900. (Based on Table XVI)

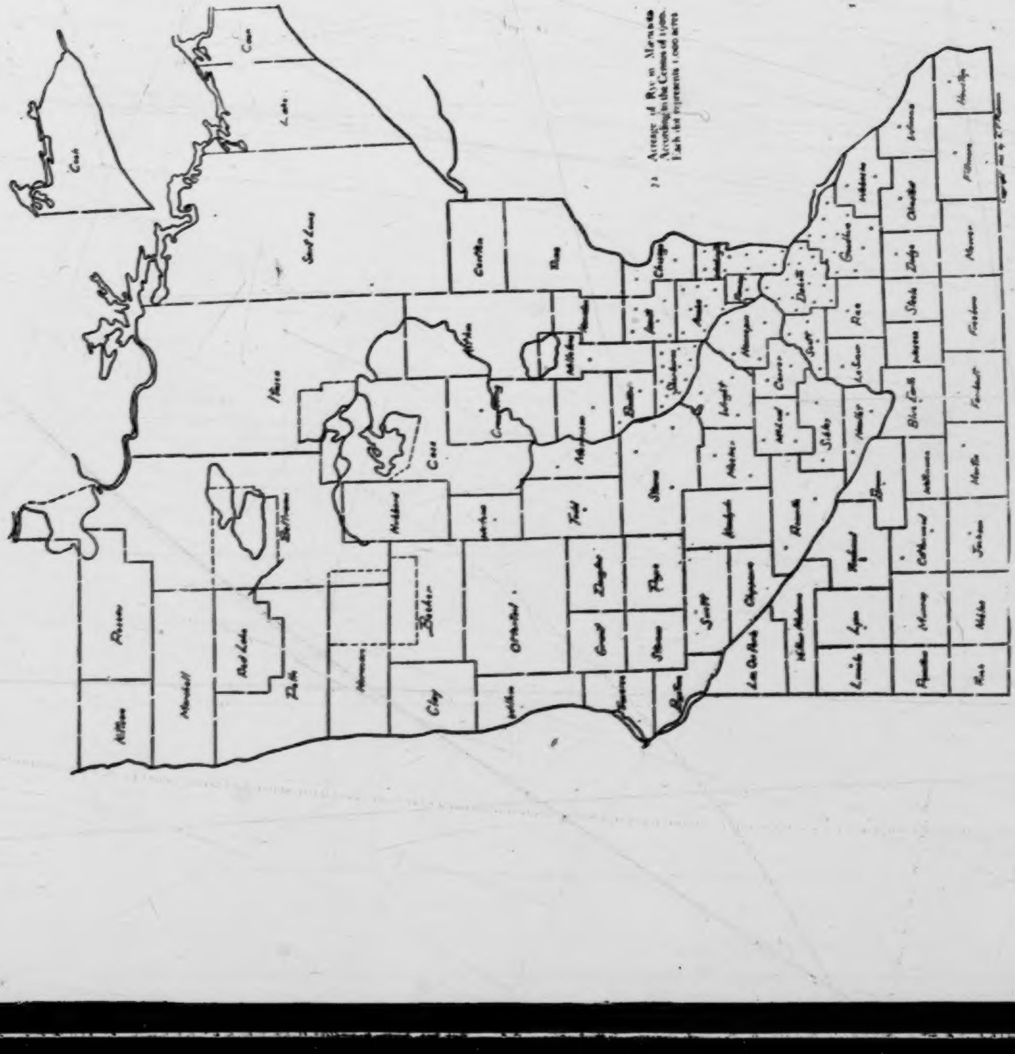

Acreage of Rye in Minnesota According to the Census of 1900. Each dot represents 1 000 acres

Figure 141. Acreage of rye in 1899 according to the census of 1900. (Based on Table XVII)

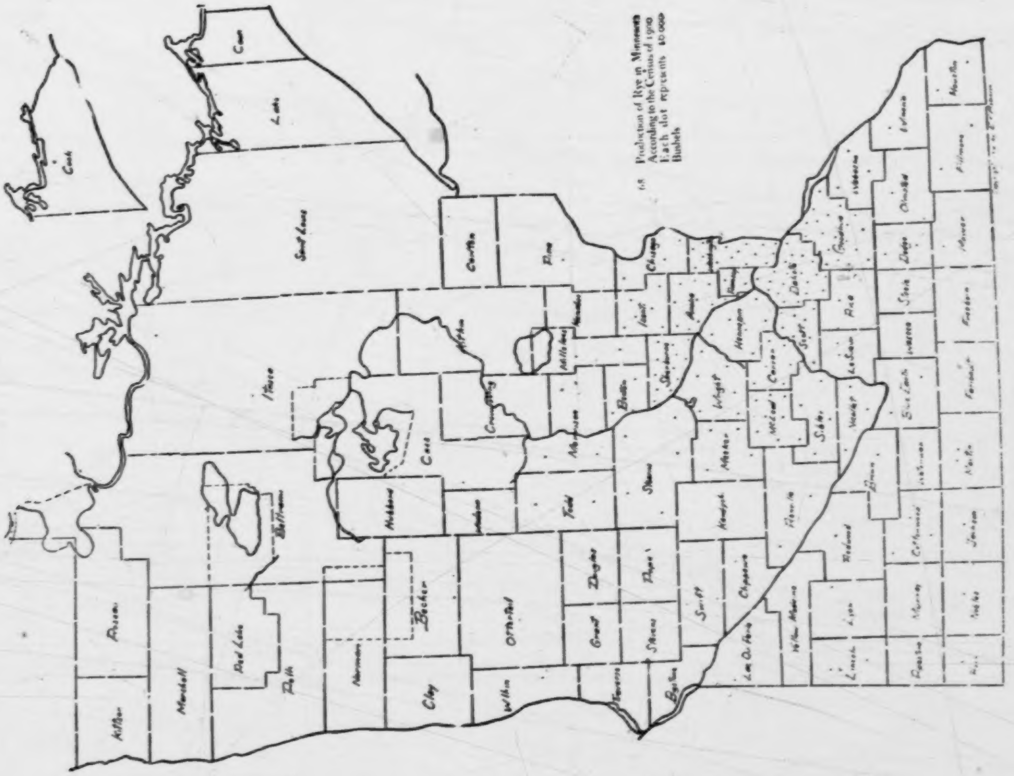
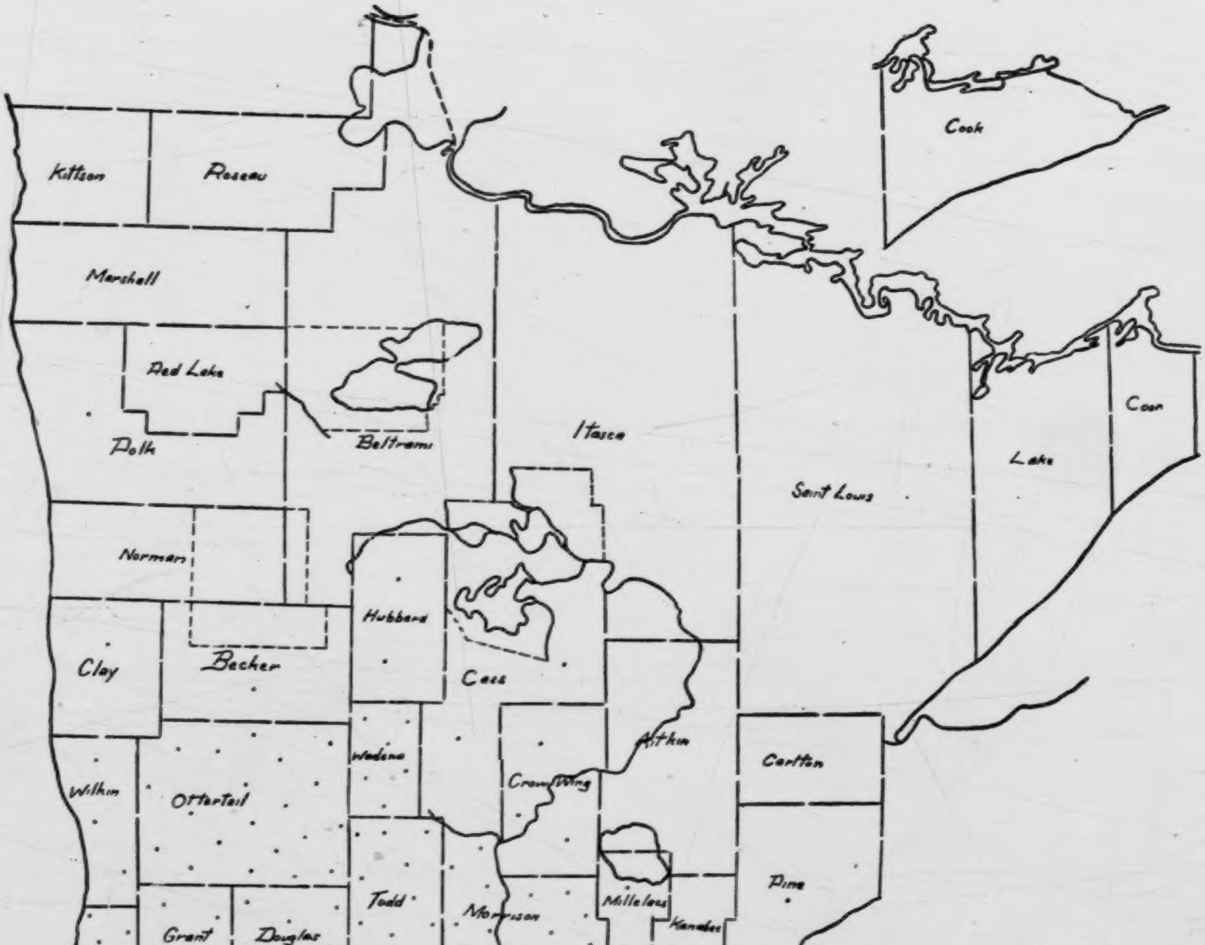
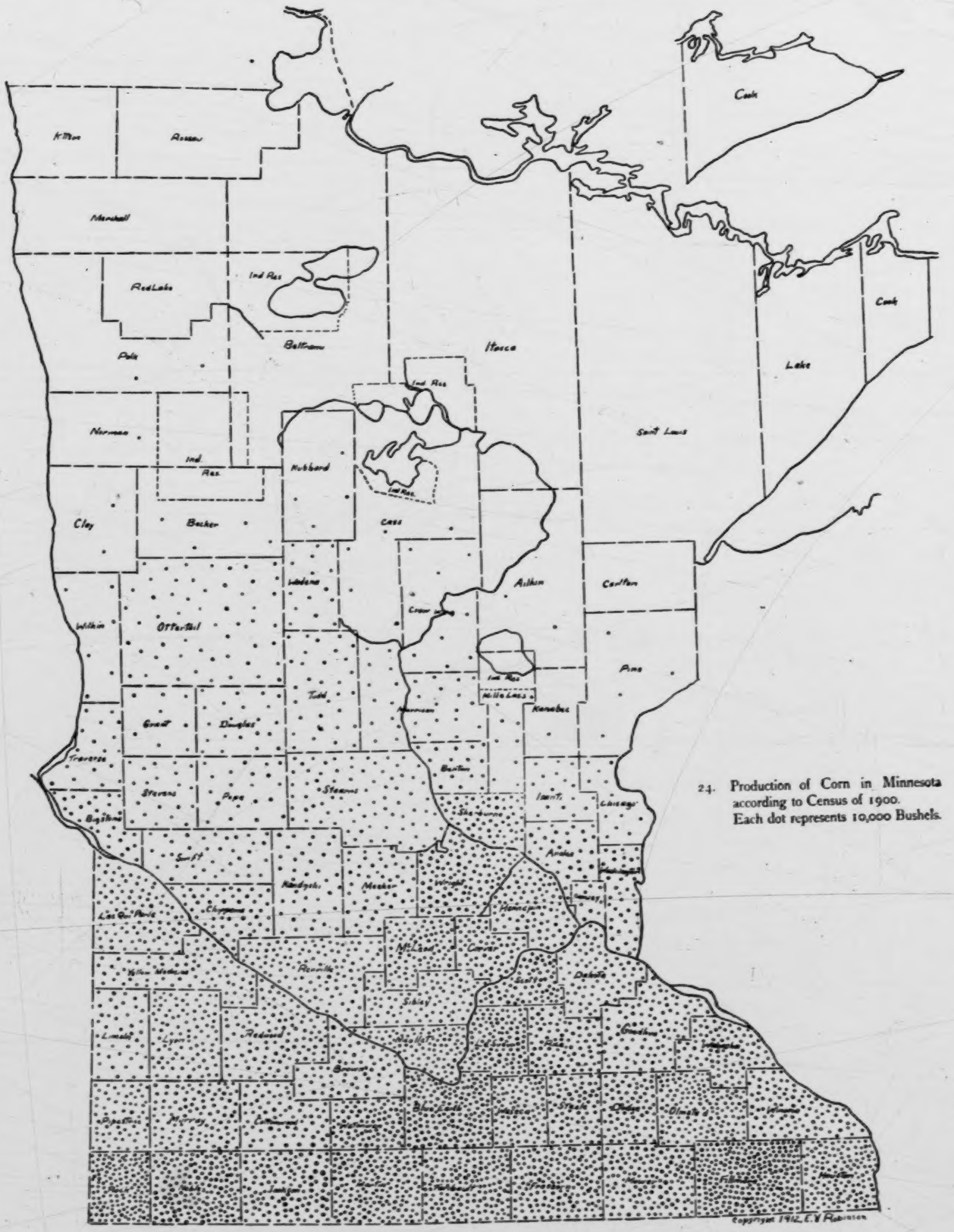

Production of Rye in Minnesota According to the Census of 1900. Each dot represents 10 000 Bushels

Figure 142. Production of rye in 1899 according to the census of 1900. (Based on Table XVII)


Kittson
Roseau
Cook
Marshall
Red Lake
Polk
Beltrami
Itasca
Saint Louis
Lake
Cook
Norman
Clay
Becker
Hubbard
Cass
Wadena
Aitkin
Carlton
Wilkin
Ottertail
Crow Wing
Todd
Morrison
Mille Lacs
Kanabec
Pine
Traverse
Grant
Douglas
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Big Stone
Sherburne
Swift
Anoka
Kandiyohi
Meeker
Wright
Washington
Lac Qui Parle
Chippewa
Hennepin
Ramsey
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Copyright [illegible] by E. V. Robinson

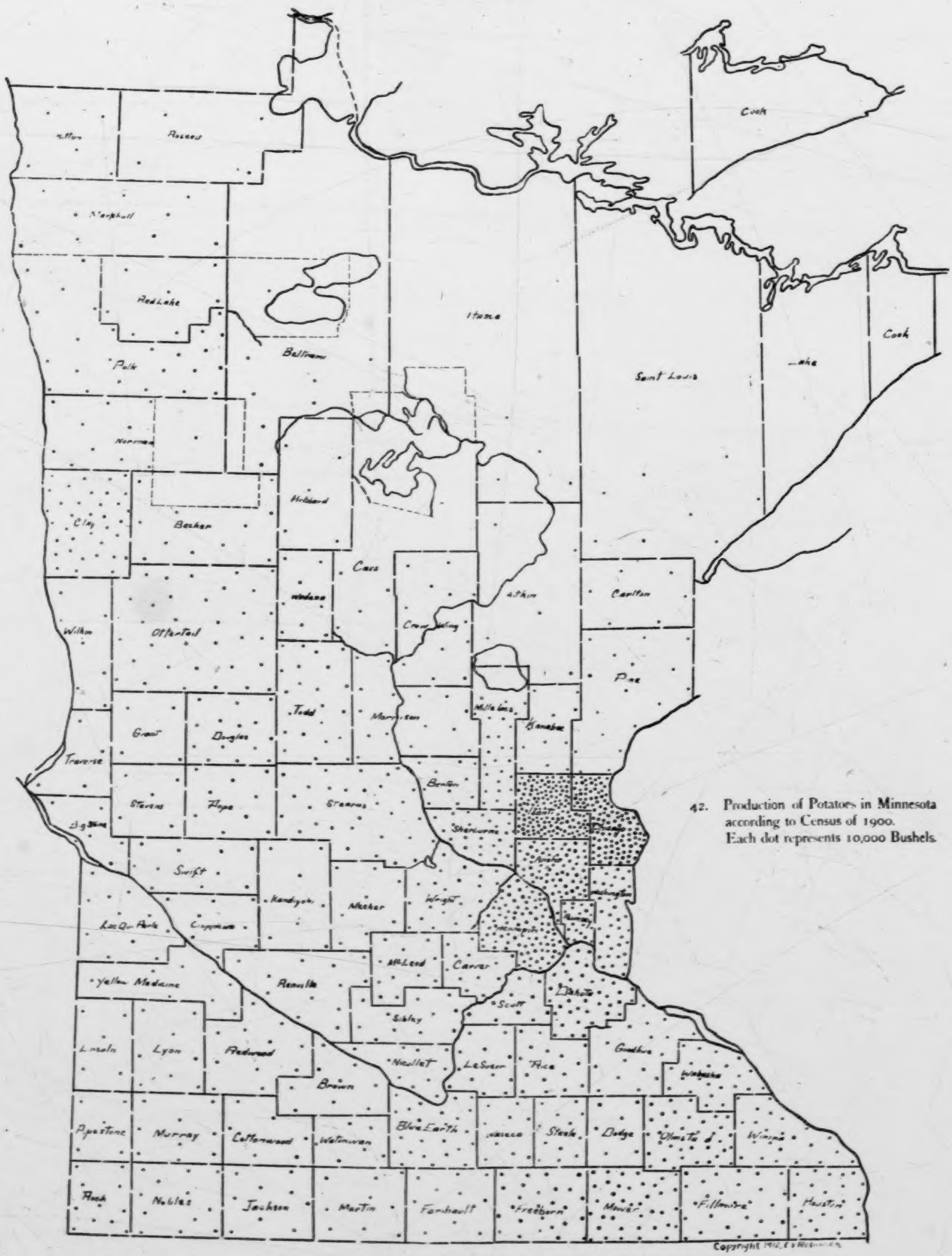
54. Acreage of Corn in Minnesota according to Census of 1900.
Each dot represents 1,000 acres.

Figure 143. Acreage of corn in 1899 according to the census of 1900. (Based on Table XV)


Kittson
Roseau
Cook
Marshall
Red Lake
Ind Res
Beltrami
Polk
Itasca
Lake
Cook
Ind Res
Norman
Ind Res.
Saint Louis
Hubbard
Ind Res.
Clay
Becker
Cass
Wadena
Aitkin
Carlton
Wilkin
Ottertail
Crow Wing
Pine
Todd
Ind Res
Mille Lacs
Grant
Douglas
Morrison
Kanabec
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Big Stone
Sherburne
Swift
Anoka
Kandiyohi
Meeker
Wright
Hennepin
Lac Qui Parle
Chippewa
McLeod
Carver
Renville
Yellow Medicine
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Goodhue
Brown
Pipestone
Murray
Copyright 1912, E. V. Robinson

24. Production of Corn in Minnesota according to Census of 1900. Each dot represents 10,000 Bushels.

Figure 144. Production of corn in 1899 according to the census of 1900. (Based on Table XV)


Roseau
Marshall
Red Lake
Polk
Beltrami
Itasca
Saint Louis
Lake
Cook
Cook
Norman
Clay
Becker
Hubbard
Cass
Wadena
Aitkin
Carlton
Crow Wing
Wilkin
Otter Tail
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Big Stone
Sherburne
Swift
Kandiyohi
Meeker
Wright
Hennepin
Ramsey
Washington
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Goodhue
Nicollet
Le Sueur
Rice
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

42. Production of Potatoes in Minnesota according to Census of 1900.
Each dot represents 10,000 Bushels.

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Figure 145. Production of potatoes in 1899 according to the census of 1900. (Based on Table XVIII)

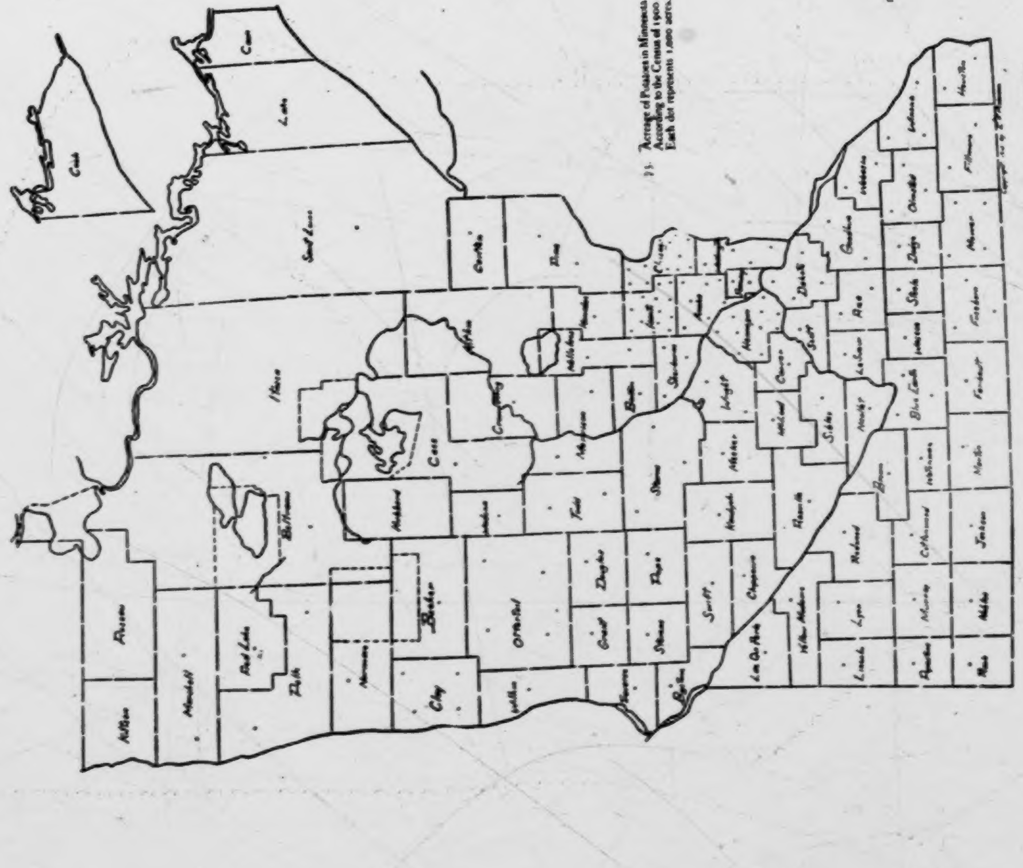
75. Acreage of Potatoes in Minnesota
According to the Census of 1900
Each dot represents 1,000 acres

Figure 146. Acreage of potatoes in 1899 according to the census of 1900.
(Based on Table XVIII)

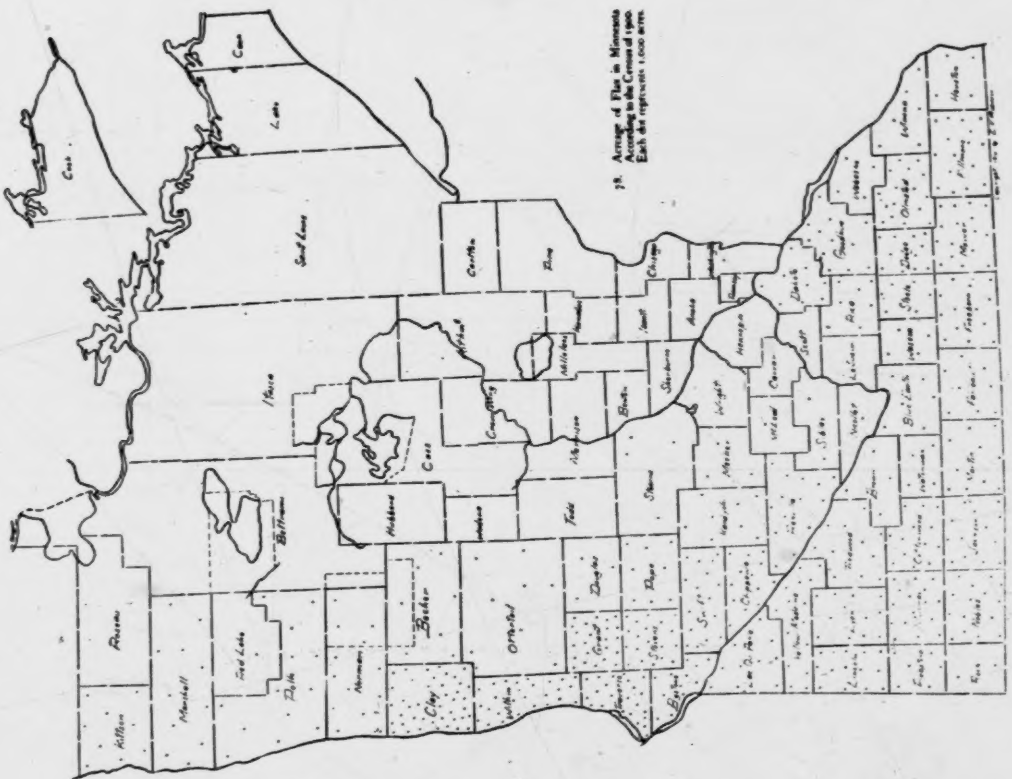
78. Acreage of Flax in Minnesota
According to the Census of 1900
Each dot represents 1,000 acres

Figure 147. Acreage of flax in 1899 according to census of 1900.
(Based on Table XIX)

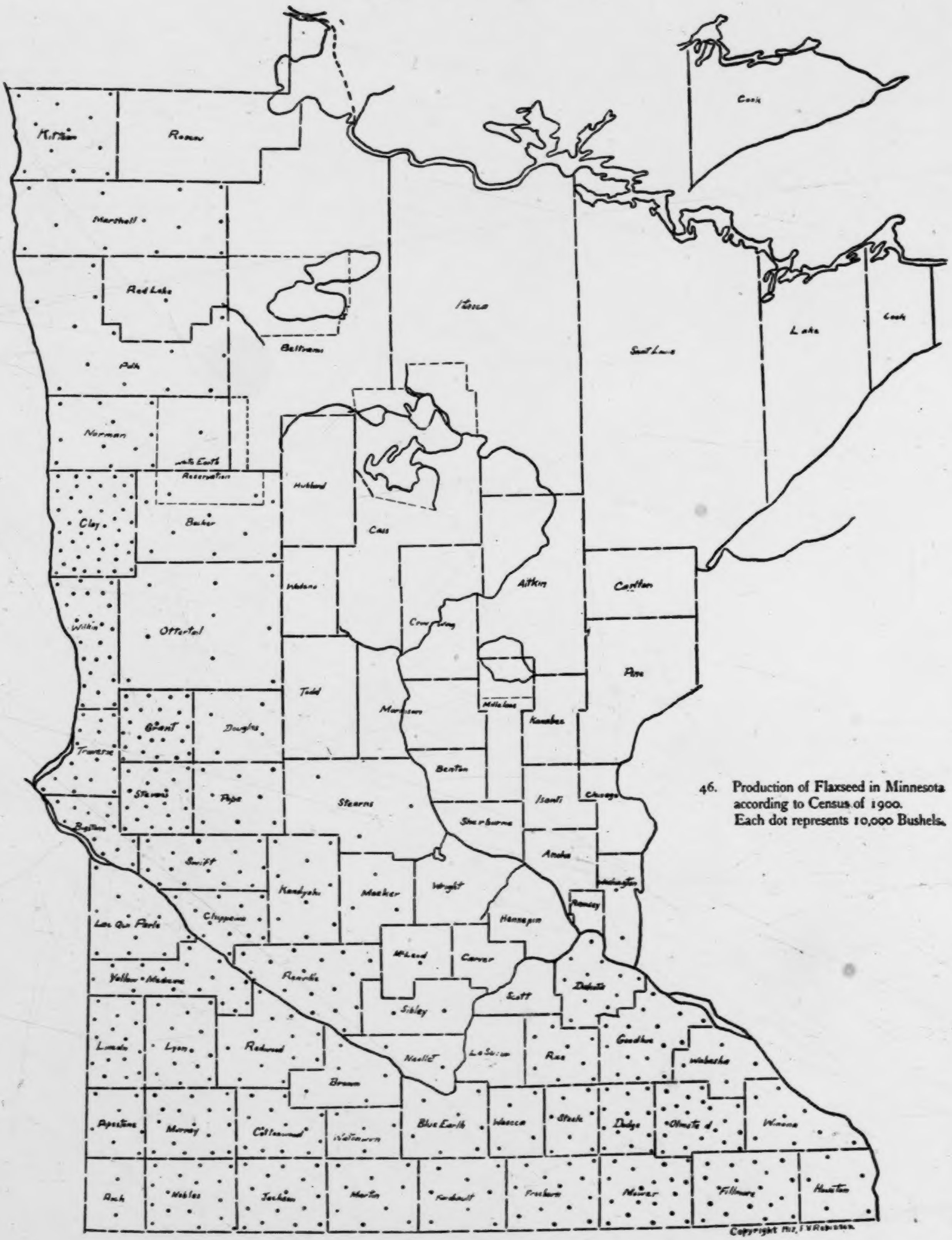
Kittson
Roseau
Cook
Marshall
Red Lake
Itasca
Beltrami
Polk
St. Louis
Lake
Cook
Norman
White Earth Reservation
Hubbard
Clay
Becker
Cass
Aitkin
Carlton
Wadena
Wilkin
Otter Tail
Crow Wing
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Sherburne
Big Stone
Anoka
Swift
Kandiyohi
Meeker
Wright
Washington
Ramsey
Hennepin
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
46. Production of Flaxseed in Minnesota
according to Census of 1900.
Each dot represents 10,000 Bushels.
Copyright 1912, E V Robinson

Figure 148. Production of flaxseed in 1899 according to the census of 1900. (Based on Table XIX)

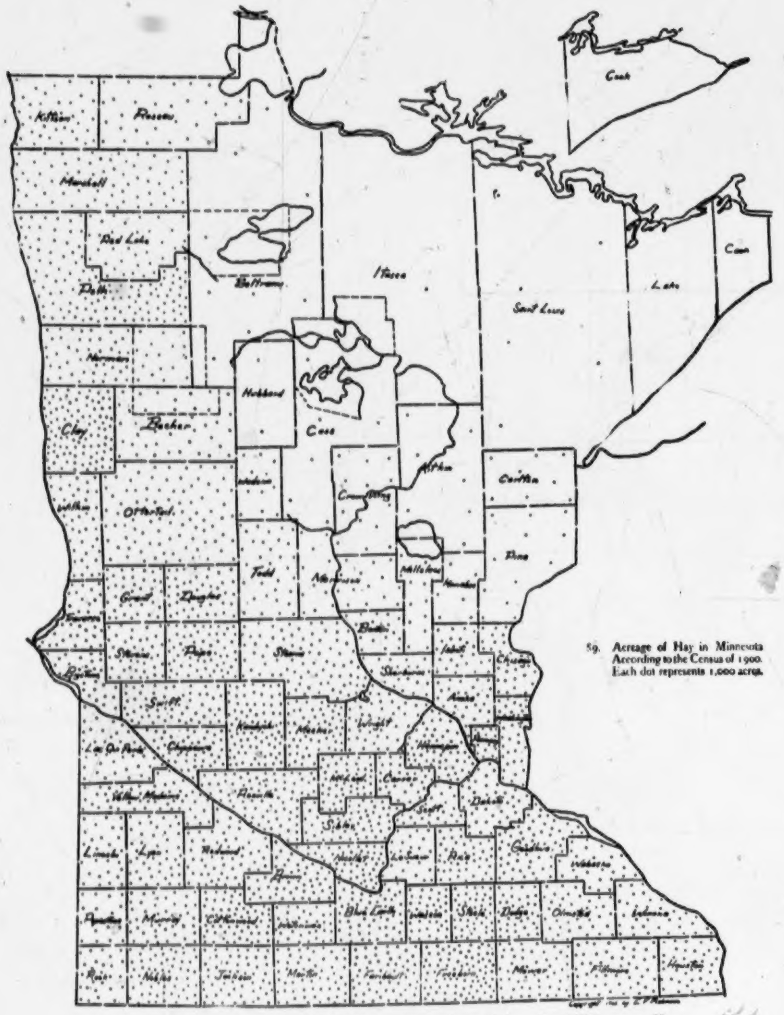
59. Acreage of Hay in Minnesota
According to the Census of 1900.
Each dot represents 1,000 acres.

Figure 149. Acreage of wild and cultivated hay in 1899 according to the census of 1900.

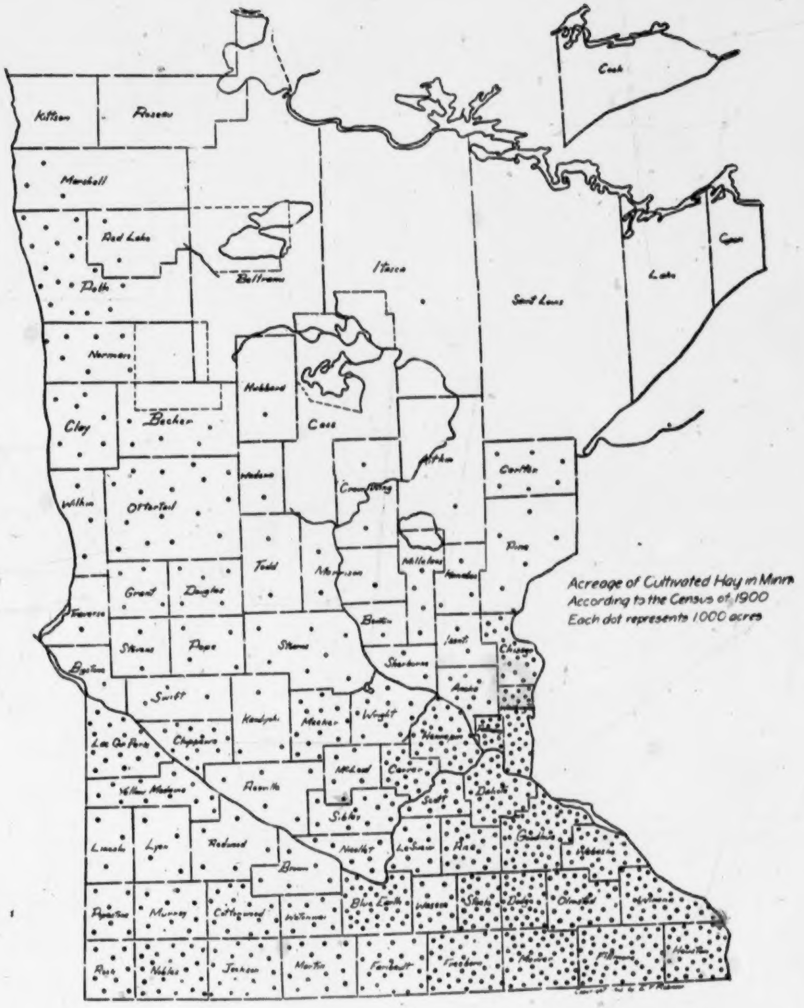
Acreage of Cultivated Hay in Minn.
According to the Census of 1900
Each dot represents 1000 acres

Figure 150. Acreage of cultivated hay in 1899 according to census of 1900.

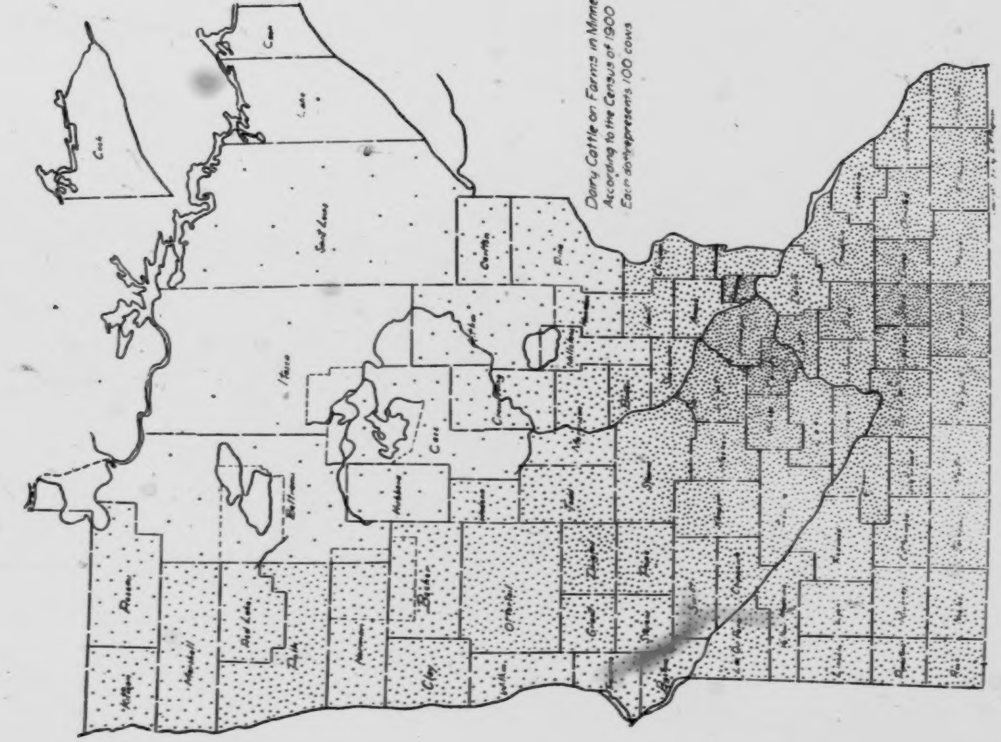
Dairy Cattle on Farms in Minnesota
According to the Census of 1900
Each dot represents 100 cows
Kittson
Roseau
Marshall
Red Lake
Polk
Norman
Clay
Becker
Otter Tail
Grant
Cass
Itasca
St. Louis
Lake
Cook
Hubbard
Beltrami
Carlton
Crow Wing
Aitkin
Mille Lacs
Pine

Figure 151. Distribution of dairy cows on farms according to the census of 1900. (Based on Table XXIV)

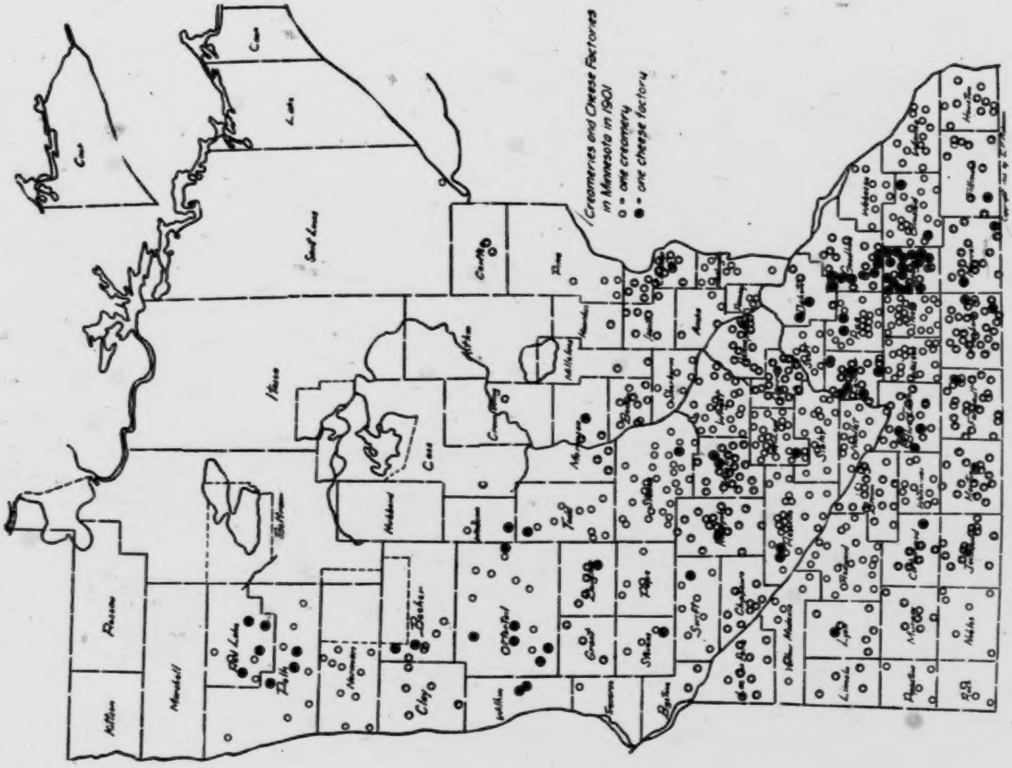
Creameries and Cheese Factories
in Minnesota in 1901
o = one creamery
● = one cheese factory
Kittson
Roseau
Marshall
Red Lake
Polk
Norman
Clay
Becker
Otter Tail
Grant
Cass
Itasca
St. Louis
Lake
Cook
Hubbard
Beltrami
Carlton
Pine
Crow Wing
Aitkin
Todd
Stearns
Lincoln
Lyon

Figure 152. Distribution of creameries and cheese factories in 1901.[53]

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[53] Biennial Report of Dairy and Food Dept., 1903, 16, 38.

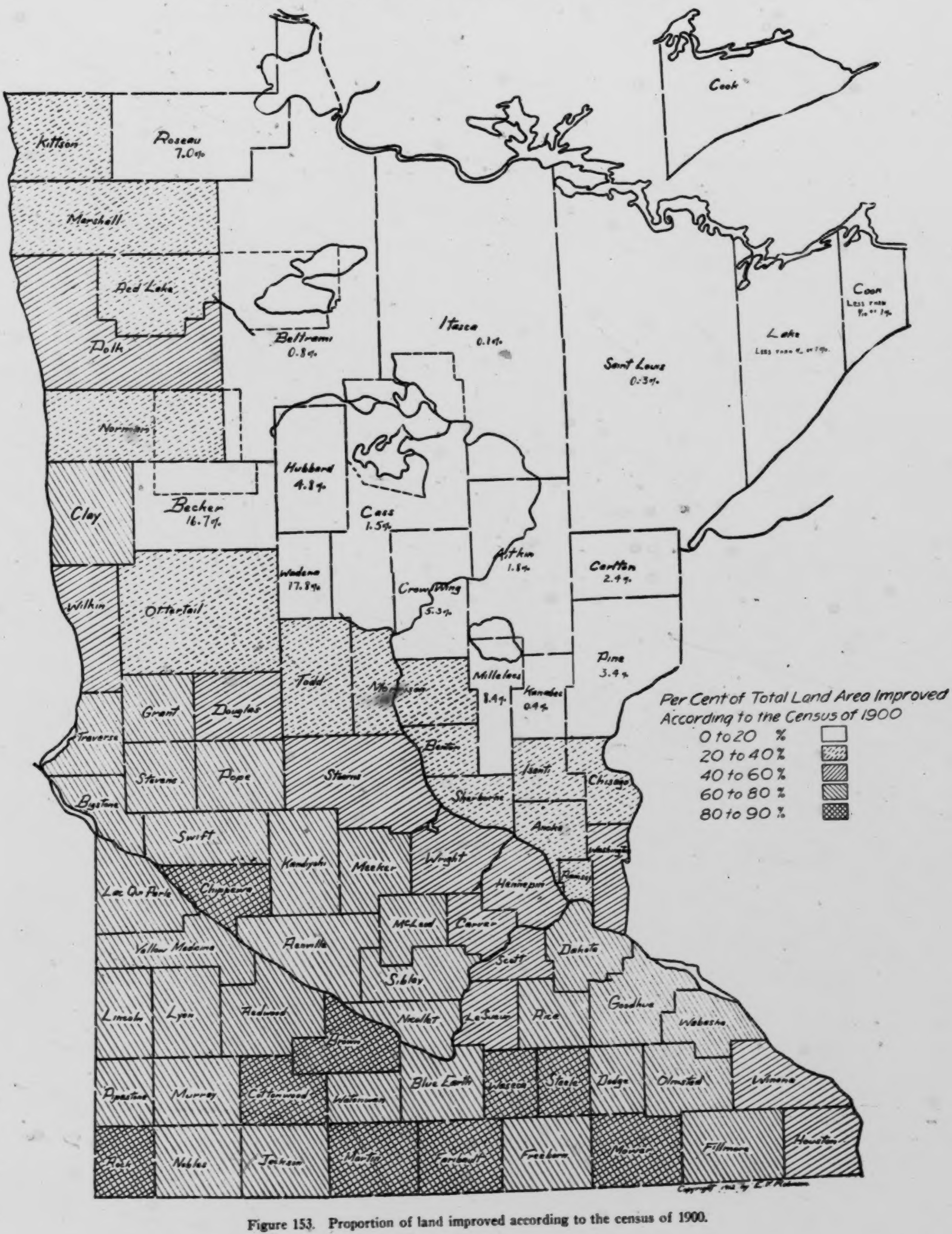
Cook
Kittson
Roseau 7.0%
Marshall
Red Lake
Polk
Beltrami 0.8%
Itasca 0.1%
Saint Louis 0.3%
Lake Less than 1/10 of 1%
Coon Less than 1/10 of 1%
Norman
Hubbard 4.8%
Clay
Becker 16.7%
Cass 1.5%
Aitkin 1.8%
Carlton 2.4%
Wadena 17.8%
Crow Wing 5.3%
Wilkin
Ottertail
Pine 3.4%
Todd
Morrison
Mille Lacs 8.4%
Kanabec 0.4%
Grant
Douglas
Benton
Traverse
Stevens
Pope
Stearns
Isanti
Chisago
Sherburne
Big Stone
Anoka
Swift
Kandiyohi
Meeker
Wright
Washington
Chippewa
Hennepin
Ramsey
Lac Qui Parle
McLeod
Carver
Yellow Medicine
Renville
Dakota
Scott
Sibley
Goodhue
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Per Cent of Total Land Area Improved
According to the Census of 1900
0 to 20 %
20 to 40 %
40 to 60 %
60 to 80 %
80 to 90 %
Copyright

Figure 153. Proportion of land improved according to the census of 1900.

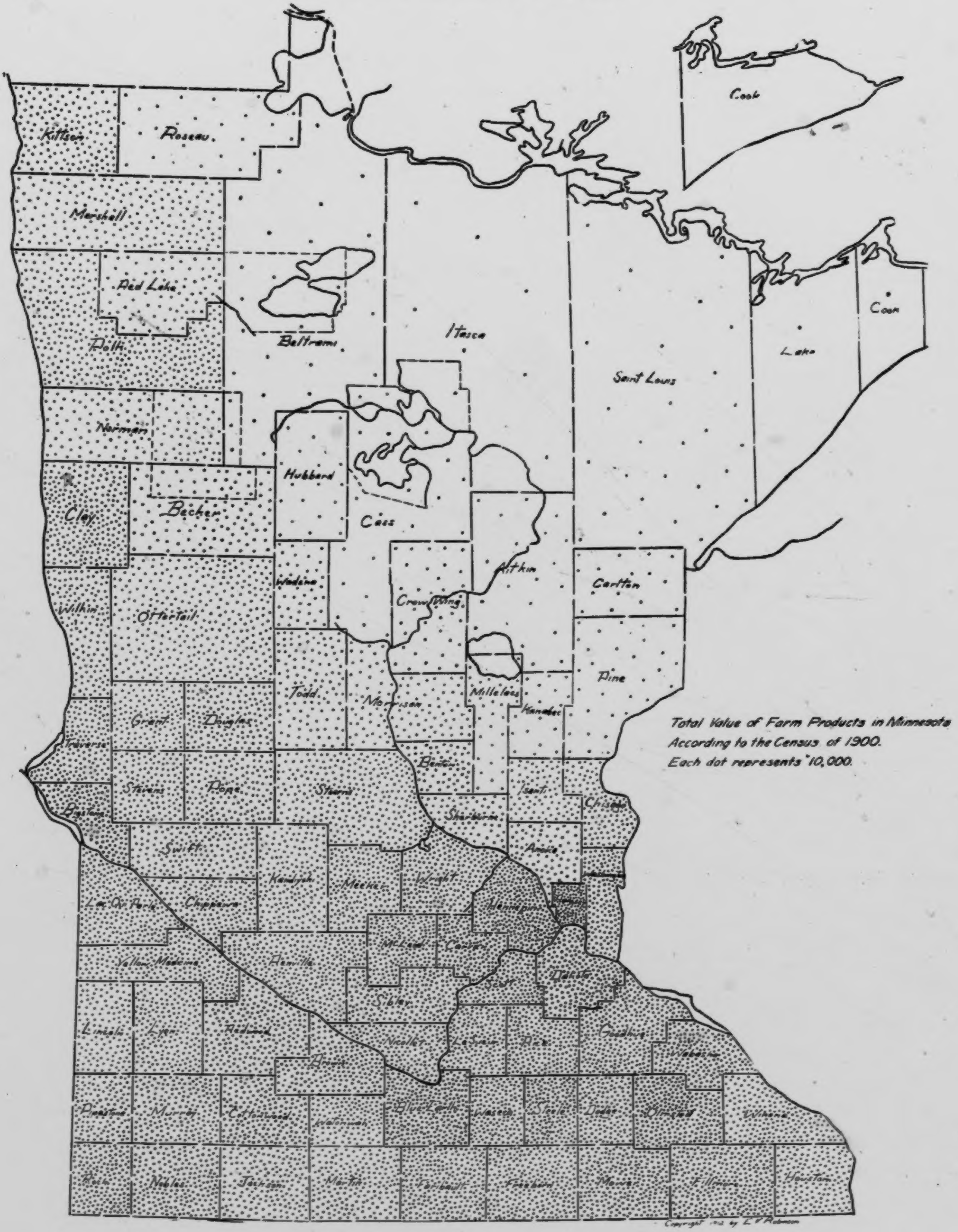
Cook
Kittson
Roseau
Marshall
Red Lake
Polk
Beltrami
Itasca
Saint Louis
Lake
Cook
Norman
Clay
Becker
Hubbard
Cass
Wadena
Crow Wing
Aitkin
Carlton
Wilkin
Otter Tail
Todd
Morrison
Mille Lacs
Kanabec
Pine
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Sherburne
Big Stone
Anoka
Swift
Kandiyohi
Meeker
Wright
Hennepin
Ramsey
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Renville
Sibley
Scott
Dakota
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Total Value of Farm Products in Minnesota
According to the Census of 1900.
Each dot represents $10,000.
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Figure 154. Distribution of value of farm products in 1899 according to the census of 1900. (Based on Table XXXV)

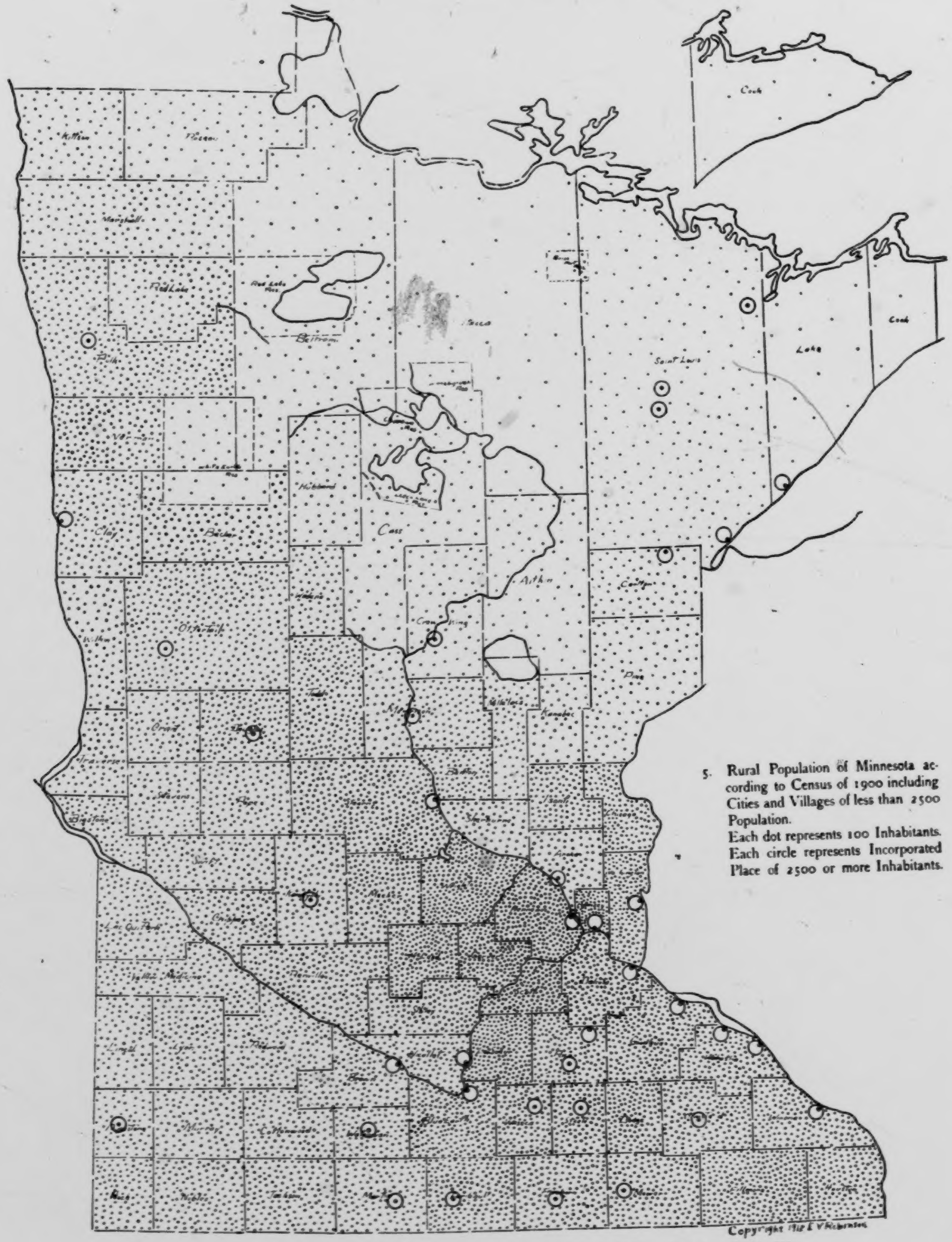
Kittson
Roseau
Marshall
Red Lake
Polk
Beltrami
Itasca
Saint Louis
Lake
Cook
Clay
Becker
Hubbard
Cass
Aitkin
Carlton
Otter Tail
Crow Wing
Pine
Todd
Grant
Traverse
Big Stone
Stevens
Pope
Lac Qui Parle
Chippewa
Yellow Medicine
Lincoln
Lyon
Redwood
Murray
Cottonwood
Rock
Nobles
Jackson
Fillmore
Houston
5. Rural Population of Minnesota according to Census of 1900 including Cities and Villages of less than 2500 Population.
Each dot represents 100 Inhabitants.
Each circle represents Incorporated Place of 2500 or more Inhabitants.
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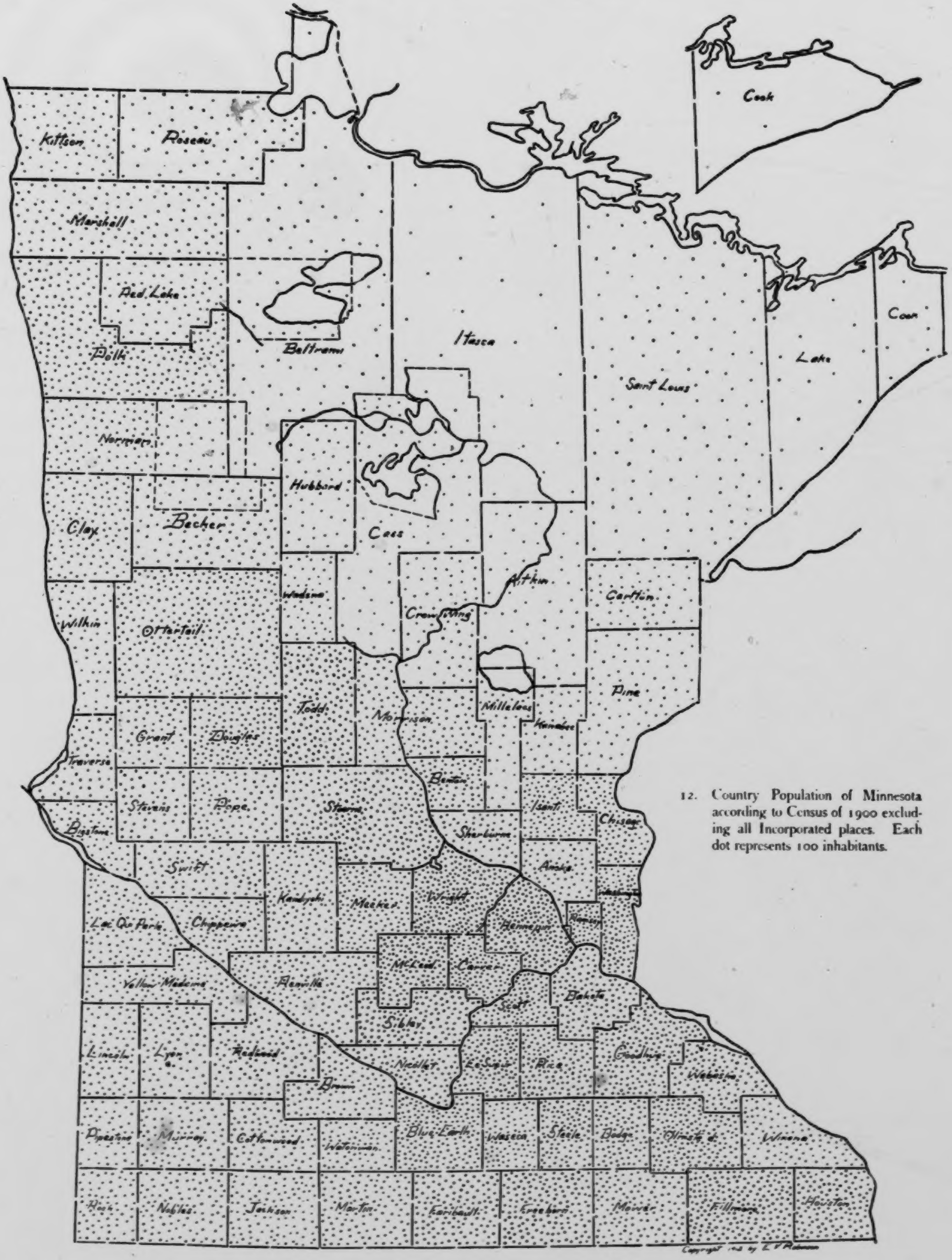
Figure 155. Distribution of population according to the census of 1900. (Based on Table XI)


Kittson
Roseau
Marshall
Red Lake
Polk
Beltrami
Itasca
Cook
Lake
Cook
Saint Louis
Norman
Hubbard
Cass
Clay
Becker
Wadena
Crow Wing
Aitkin
Carlton
Wilkin
Ottertail
Todd
Morrison
Mille Lacs
Kanabec
Pine
Grant
Douglas
Traverse
Stevens
Pope
Stearns
Benton
Isanti
Chisago
Big Stone
Sherburne
Swift
Anoka
Kandiyohi
Meeker
Wright
Washington
Lac Qui Parle
Chippewa
Hennepin
Ramsey
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Copyright [illegible] by E V Robinson

12. Country Population of Minnesota according to Census of 1900 excluding all Incorporated places. Each dot represents 100 inhabitants.

Figure 156. Population outside incorporated places at census of 1900. (Based on Table XI)

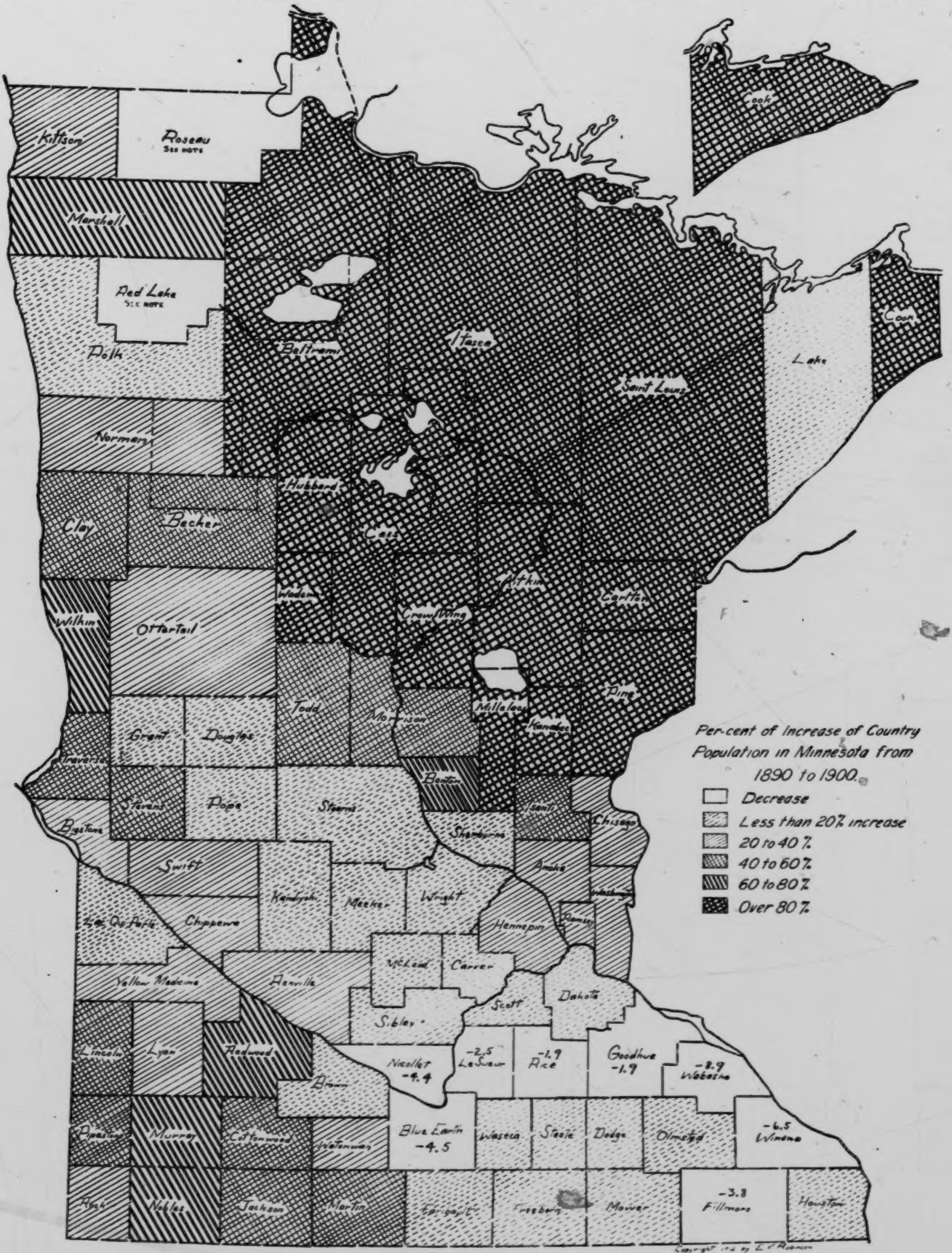
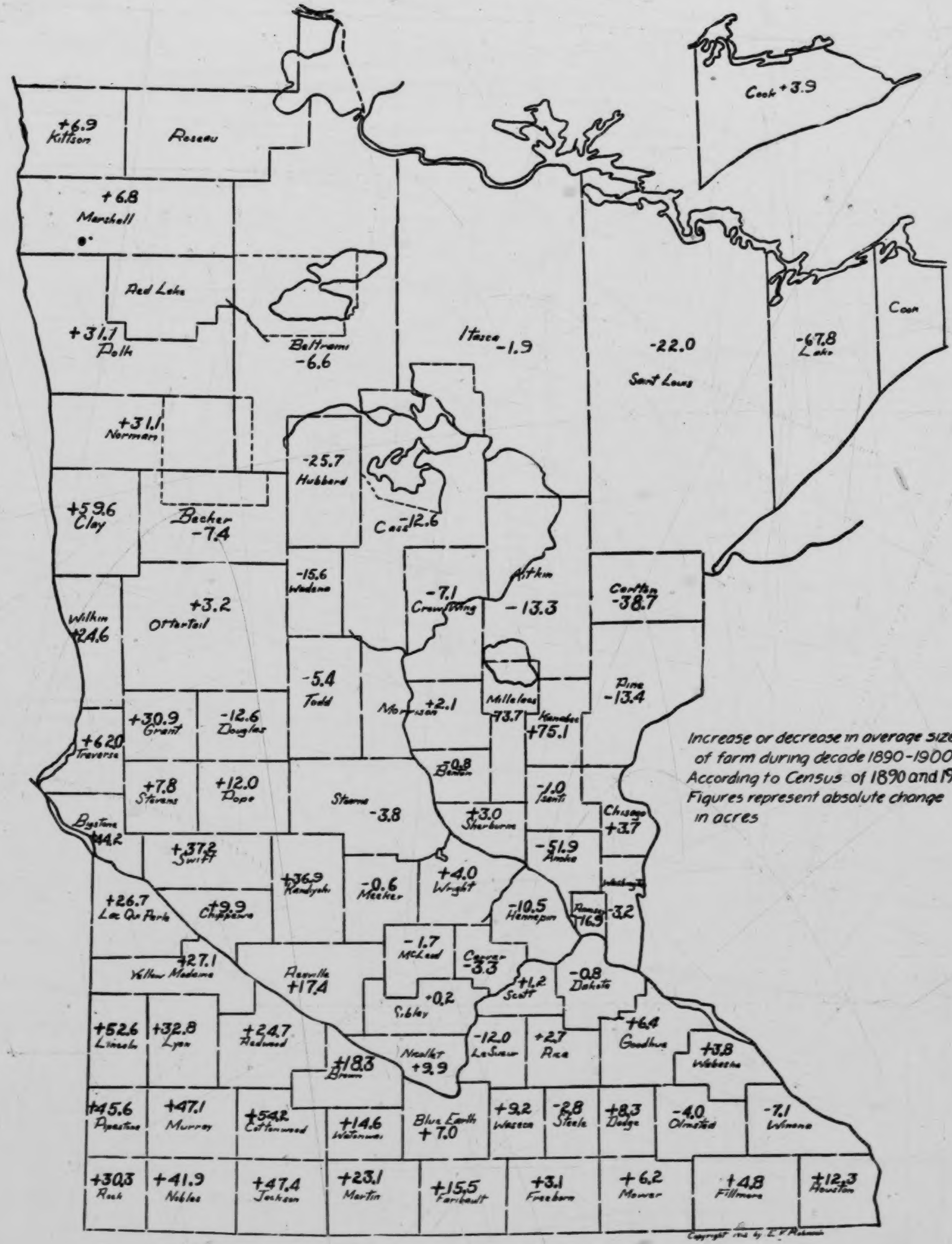

Per-cent of Increase of Country Population in Minnesota from 1890 to 1900.
Decrease
Less than 20% increase
20 to 40%
40 to 60%
60 to 80%
Over 80%
Kittson
Roseau
See note
Marshall
Red Lake
See note
Polk
Norman
Clay
Becker
Wilkin
Ottertail
Grant
Douglas
Traverse
Stevens
Pope
Big Stone
Swift
Lac Qui Parle
Chippewa
Yellow Medicine
Lincoln
Lyon
Redwood
Pipestone
Murray
Cottonwood
Rock
Nobles
Jackson
Beltrami
Itasca
Saint Louis
Lake
Cook
Cook
Hubbard
Cass
Wadena
Crow Wing
Aitkin
Carlton
Pine
Todd
Morrison
Mille Lacs
Kanabec
Benton
Stearns
Sherburne
Isanti
Chisago
Anoka
Washington
Ramsey
Hennepin
Kandiyohi
Meeker
Wright
McLeod
Carver
Renville
Sibley
Scott
Dakota
Brown
Nicollet
-4.4
-2.5
Le Sueur
-1.9
Rice
Goodhue
-1.7
-8.9
Wabasha
Watonwan
Blue Earth
-4.5
Waseca
Steele
Dodge
Olmsted
-6.5
Winona
Martin
Faribault
Freeborn
Mower
-3.8
Fillmore
Houston
Copyrighted by E. V. Robinson

Figure 157. Changes in country population, 1890-1900.[64] (Based on Table XI)

[64] Roseau and Red Lake counties formed from Kittson and Polk, distributing figures for these counties, which nevertheless showed an increase in population and size of farms.


+6.9 Kittson
Roseau
Cook +3.9
+6.8 Marshall
Red Lake
+31.1 Polk
Beltrami -6.6
Itasca -1.9
-22.0 Saint Louis
Cook
-67.8 Lake
+31.1 Norman
-25.7 Hubbard
+59.6 Clay
Becker -7.4
Cass -12.6
-15.6 Wadena
-7.1 Crow Wing
Aitkin -13.3
Carlton -38.7
Wilkin +24.6
+3.2 Otter Tail
-5.4 Todd
Morrison +2.1
Mille Lacs 73.7
Kanabec +75.1
Pine -13.4
+30.9 Grant
-12.6 Douglas
+62.0 Traverse
-0.8 Benton
+7.8 Stevens
+12.0 Pope
Stearns -3.8
-1.0 Isanti
+3.0 Sherburne
Chisago +3.7
Big Stone +14.2
+37.2 Swift
-51.9 Anoka
+36.9 Kandiyohi
-0.6 Meeker
+4.0 Wright
Washington
+26.7 Lac Qui Parle
+9.9 Chippewa
-10.5 Hennepin
Ramsey 16.9
-3.2
-1.7 McLeod
Carver -3.3
+27.1 Yellow Medicine
Renville +17.4
+1.2 Scott
-0.8 Dakota
+0.2 Sibley
+6.4 Goodhue
+52.6 Lincoln
+32.8 Lyon
+24.7 Redwood
-12.0 Le Sueur
+2.7 Rice
+3.8 Wabasha
+18.3 Brown
Nicollet +9.9
+45.6 Pipestone
+47.1 Murray
+54.2 Cottonwood
+14.6 Watonwan
Blue Earth +7.0
+9.2 Waseca
-2.8 Steele
+8.3 Dodge
-4.0 Olmsted
-7.1 Winona
+30.3 Rock
+41.9 Nobles
+47.4 Jackson
+23.1 Martin
+15.5 Faribault
+3.1 Freeborn
+6.2 Mower
+4.8 Fillmore
+12.3 Houston
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Increase or decrease in average size of farm during decade 1890-1900 According to Census of 1890 and 1900 Figures represent absolute change in acres

Figure 158. Changes in average size of farms from 1890 to 1900.[54] (Based on Table XXXVI)

[54] Roseau and Red Lake counties formed from Kittson and Polk, distributing figures for these counties, which nevertheless showed an increase in population and size of farms.

hand, oats had gained 39.4 per cent, corn 59.9, and barley 144.9 per cent in acreage, all with a larger yield per acre. The same relation obtained in the case of flaxseed, which increased 86.7 per cent in acreage. Potatoes, on the other hand, increased 38.5 per cent in number of acres, but only 31.2 per cent in total production, showing a smaller yield per acre. Measured by the country population, all these crops, except buckwheat, increased materially both their acreage and their yield, giving thus an increased output per man. This result showed a continued gain in technical efficiency of labor, due to a larger amount of machinery and other capital goods per unit of labor. The only decreases, measured by population, were in buckwheat, beans, and certain other very minor crops. Hay and forage (wild and tame), while showing a smaller acreage, gave a larger cut in proportion to the country population, owing in part to a larger proportion of cultivated hay. All kinds of orchard and garden products, so far as the census items are comparable, also gained both absolutely, and relatively to the country population (Items 10-84).

All important classes of live stock increased faster than the country population, the greatest relative increase being in swine, next in cattle of all sorts, then in horses, and last in sheep. It is evident that dairy cows also increased, though by reason of different classifications in the two censuses, an exact comparison is not possible. There was likewise a notable increase in poultry, especially chickens, which are frequently associated with dairy farming (Items 85-119).

Animal products naturally showed a corresponding rate of increase, exceeding in most cases the growth of country population. This relation obtained as to milk produced, butter, eggs, and wool, the most striking increases being in eggs and butter, and especially in factory as compared with farm butter. On the other hand, for reasons previously stated (page 113), the production of cheese declined both relatively and absolutely. A similar decrease occurred in the production of honey, probably because of the difficulty of discovering and preventing the sale of adulterated or imitation honey; but it was a curious fact, if fact it was, that while the output of honey declined, there was a larger production of beeswax. Unless bees were being bred to build thicker combs, the presumption is that this discrepancy arose from another inaccuracy in the census (Items 120-144).

Turning now to relative values (Items 145-155), it appears that against an increase of 25.7 per cent in country population, there was a gain of 54.3 per cent in value of live stock, 77.9 per cent in implements, 307.8 per cent in fertilizers purchased, 126.3 per cent in value of all farm products, and 96.9 per cent in value of farms with buildings. The increases in live stock, implements, and fertilizers, of course, go far to explain the increased output per capita of the country population. In the case of wheat, however, there was not only an average yield of a bushel less per acre in 1899, compared to 1889, but also a similar reduction in the market price. It is evident, therefore, that the increased value of products, in so far as not the result of increased acreage, was due to items other than wheat, and presumably in large measure to dairy products.

From 1870 to 1890 increase in land values had outrun value of products (page134); from 1890 to 1900, on the contrary, value of products increased faster than farm values (Items 145, 155). In order to eliminate so far as possible the influence of increased acreage on these changes, the totals in Table 18 are reduced in Table 16 to the acre basis.

TABLE 16.—AGRICULTURAL CHANGES IN MINNESOTA AS A WHOLE FROM 1890-1900

	Value of products per acre of farms	Value of products per acre of improved land	Value of farms* per acre	Value of farms* per acre of improved land	Percentage of total farm land improved	Value of land and improvements other than buildings per acre of farms	Value of land and improvements other than buildings per acre of improved land
1900	$6.14	$8.74	$25.51	$36.30	70.3%	$21.31	$30.33
1890	$3.82	$6.40	$18.22	$30.56	59.6%	......	......
Absolute change	$2.32	$2.34	$7.29	$5.74	10.7%	......	......
Percentage of change	60.8%	36.6%	40.0%	18.8%	18.0%	......	......

From Table 16 it is evident that the value of products increased $2.32, and the value of farms $7.29, per acre of all farm land; while the corresponding figures per acre of improved farm land were $2.34 for products and $5.74 for value of farms. Stated proportionally, the value of products per acre of improved land increased 36.6 per cent, against 18.8 per cent for value of farms, or approximately twice as fast. For the first time since comparison became possible (1870), value of products thus outran value of farms (Fig. 219).

Theoretically, this is what ought to happen under the law of decreasing returns. Once the stage of extensive pioneer agriculture is passed, increased returns per acre are in general won at an increased expense per unit of product. It follows that the ratio of net to gross returns per acre naturally declines as agriculture becomes more intensive; and, consequently, if the rate of interest remains constant, that the capitalized value of such net returns, represented by the value of the land, will usually increase less rapidly than the gross returns per acre.

It may be doubted, however, whether this explanation is fully adequate. In the first place, the question why this relation between value of products and value of farms did not appear sooner presents itself. Certainly it is difficult to believe that the point of increasing expense per unit was not reached prior to 1890. Again, less rather than more labor was being put on each acre, as shown by the increasing acreage of improved land per capita of the country population; though it is of course possible that this movement had gone so far as to encounter decreasing returns per acre, accompanied by increasing returns per man. Further, during the closing part of the decade, prices in general began to advance. This advance would naturally benefit the farmers, since wages move less readily than commodity prices; and it would, therefore, tend to increase rather than decrease the ratio of net to gross farm earnings.

---

*Value of farms includes value of buildings.

In view of these considerations it appears necessary to take account of two other facts which clearly had some bearing on the matter. For one thing, the panic of 1893, and the following depression, destroyed whatever speculative land values there were in 1890. Finally, the turn of the tide shown by the rising level of prices came so late in the decade that the rising value of products had not yet been reflected in the value of farms, as happened in the following decade.

Coincident with this evidence of agricultural prosperity, the percentage of farms operated by owners, which had declined from 90.85 in 1880 to 87.07 in 1890, fell to 82 per cent in 1900.

TABLE 17.—PROGRESS OF AGRICULTURE, 1880-1890, ACCORDING TO THE U. S CENSUS

Items	1880	1890	Percentage of increase or decrease (a minus sign denotes decrease)	Per 100 of the country population	
				1880	1890
I. Population:					
1. Country population	543,193	708,114*	30.4	....	....
2. Town population	237,580	602,169	153.5	....	....
3. Total population	780,773	1,310,283	67.8	....	....
II. Acreage:					
4. Improved land in farms, acres	7,246,693	11,127,953	53.6	1,334.09	1,571.4
4a. Permanent pastures, meadows, orchards and vineyards, acres	1,727,325	(No report)	....	317.99	....
4b. Tilled land including fallows and grass in rotation, acres	5,519,368	(No report)	....	1,016.09	....
5. Unimproved land in farms, acres	6,156,326	7,535,692	22.4	1,133.36	1,064.2
5a. Woodland in farms, acres	2,030,726	(No report)	....	373.85	....
6. Total land in farms, acres	13,403,019	18,663,645	39.2	2,467.45	2,635.7
7. Percentage of land area in farms	25.9	36.1	39.4	....	....
8. Number of farms	92,386	116,851	26.9	17.01	16.5
9. Average size of farms, acres	145.1	159.7	10.1	....	....
10. Average improved land per farm	78.4	95.2	21.5	....	....
11. Percentage of all farm land improved	54.1	59.6	10.2	....	....
III. Farms by size groups:					
12. Under 3 acres, number	36	(No report)	....	.007	....
12a. Under 3 acres, percentage of total	.04	(No report)	....	....	....
12b. Three and under 10, number	604	(No report)	....	.11	....
12c. Three and under 10, percentage of total	.65	(No report)	....	....	....
12d. Total under 10 acres, number	640	812	26.9	.12	.12
12e. Total under 10 acres, percentage of total	.69	.69	0	....	....
12f. Ten and under 20, number	952	1,210	27.1	.18	.17
12g. Ten and under 20, percentage of total	1.03	1.04	1.0	....	....
12h. Twenty and under 50, number	8,003	9,742	21.7	1.47	1.37
12i. Twenty and under 50, percentage of total	8.7	8.3	—4.6	....	....
12j. Fifty and under 100, number	25,530	26,163	2.5	4.7	3.7
12k. Fifty and under 100, percentage of total	27.6	22.4	—18.8	....	....
12l. 100 and under 500, number	56,375	77,048	36.7	10.4	10.9
12m. 100 and under 500, percentage of total	61.0	65.9	8.0	....	....

*The country population for 1890 includes 8,457 persons reported from Indian reservations. The statistics of agriculture for 1890 do not embrace Indian reservations.

Items	1880	1890	Percentage of increase or decrease	Per 100 of the country population	
				1880	1890
12n. 500 and under 1,000, number	741	1,594	115.2	.14	.22
12o. 500 and under 1,000, percentage of total	.81	1.36	67.9	....	....
12p. 1,000 acres and over, number	145	282	94.5	.03	.04
12q. 1,000 acres and over, percentage of total	.16	.24	50.0	....	....
IV. Farm Products:					
13. Wheat, acres	3,044,670	3,372,627	10.8	560.5	476.3
14. Wheat, bushels	34,601,030	52,300,247	51.2	6,369.9	7,385.9
15. Oats, acres	617,469	1,579,258	155.8	113.7	223.0
16. Oats, bushels	23,382,158	49,958,791	113.7	4,304.6	7,055.2
17. Barley, acres	116,020	358,510	209.0	21.4	50.6
18. Barley, bushels	2,972,965	9,100,683	206.1	547.3	1,285.2
19. Rye, acres	13,614	62,869	361.2	2.5	8.9
20. Rye, bushels	215,245	1,252,663	481.9	39.6	176.9
21. Buckwheat, acres	3,677	22,090	502.1	.67	3.1
22. Buckwheat, bushels	41,756	281,705	574.6	7.7	39.6
23. Total, small grains, acres	3,795,450	5,395,354	42.2	698.7	761.9
24. Total, small grains, bushels	61,213,154	112,894,089	84.4	11,269.1	15,942.9
25. Corn, acres	438,737	901,690	105.5	80.8	127.3
26. Corn, bushels	14,831,741	24,696,446	66.5	2,730.5	3,487.6
27. Peas, bushels	6,452	8,965†	38.9	1.2	1.3
28. Beans, bushels	18,587	61,009	228.3	3.4	8.6
29. Irish potatoes, acres	(No report)	105,880	....	....	15.0
30. Irish potatoes, bushels	5,184,676	11,155,707	115.2	954.5	1,575.4
31. Sweet potatoes, acres	(No report)	7	....	....	.001
32. Sweet potatoes, bushels	None	365	....	....	.052
33. Flaxseed, acres	(No report)	303,635	....	....	42.9
34. Flaxseed, bushels	98,689	2,721,987	2,697.7	18.2	384.4
35. Clover seed, bushels	18,003	87,240	384.6	3.3	12.3
36. Grass seed, bushels	30,707	507,459	1,552.6	5.7	71.7
37. Peanuts, acres	(No report)	7	....	....	.001
38. Peanuts, bushels	(No report)	145	....	....	.020
39. Total, bushel crops, bushels	81,402,009	152,133,502	86.9	14,985.8	21,484.3
40. Hay,* acres	1,053,378	2,709,191	157.2	193.9	382.6
41. Hay, tons	1,637,109	3,135,241	91.5	301.4	442.2
42. Tobacco, acres	163	49	—69.9	.03	.007
43. Tobacco, pounds	69,922	23,285	—66.7	12.9	3.3
44. Hops, acres	30	2	—93.4	.006	.0003
45. Hops, pounds	10,928	500	—95.4	2.0	.07
46. Hemp, tons	20	None	....	.004	....
47. Flax straw, tons	(No report)	31,163	....	....	4.4
48. Flax fiber, pounds	497	8,609	1,632.2	.09	1.2
49. Broom corn, acres	(No report)	80	....	....	.011
50. Broom corn, pounds	68,433	42,090	—37.0	12.6	5.9
51. Maple sugar, pounds	76,972	34,917	—54.6	14.2	4.9
52. Maple syrup, gallons	11,407	12,091	6.0	2.1	1.7
53. Sorghum syrup, gallons	543,369	340,792	—37.3	100.0	48.1
54. Sorghum sugar, pounds	190	(No report)	....	.035	....
55. Sorghum, acres	(No report)	3,890	....	....	.54

*Includes wild and cultivated hay.
†In addition 1,288 bushels of cow peas are reported.

Items	1880	1890	Percentage of increase or decrease	Per 100 of the country population	
				1880	1890
56. Market gardening, value of products	$166,030	$612,451†	268.9	$30.57	$86.49
57. Forest products, value	$1,796,260	(No report)	....	$330.68	....
58. Orchard fruits, number of trees bearing	(No report)	215,381	....	....	30.4
59. Orchard fruits, bushels	(No report)	85,603	....	....	12.1
60. Orchard products, value	$121,648	(No report)	....	$22.39	....
61. Nursery trees and plants, acres bearing	(No report)	809	....	....	.11
62. Seed farms, acres planted	(No report)	856	....	....	.12
63. Florists' establishments, area under glass in square feet	(No report)	408,612	....	....	57.7
V. Live Stock on Farms:					
64. Horses	257,282	461,509	79.4	47.3	65.2
65. Mules and asses	9,019	9,511	5.5	1.7	1.3
66. Milch cows	275,545	593,908	115.5	50.7	83.9
67. Working oxen	36,344	32,505	—10.6	6.7	4.6
68. Other cattle	347,161	747,166	115.2	63.9	105.5
69. Sheep	267,598*	399,049	49.1	49.3	56.4
70. Swine	381,415	853,715	123.9	70.2	120.6
71. Total live stock	1,574,364	3,097,363	96.7	289.8	437.4
VI. Poultry on Farms:					
72. Chickens	2,098,824	4,448,831	112.0	386.4	628.3
73. All other poultry	159,561	295,380	85.1	29.4	41.7
74. Turkeys	Not reported separately	151,459	....	....	21.4
75. Geese		69,224	....	....	9.8
76. Ducks		74,697	....	....	10.5
77. Total poultry	2,258,385‡	4,744,211	110.0	415.8	670.0
VII. Animal Products:					
78. Number of fleeces	267,598	312,861	16.9	49.3	44.2
79. Wool, pounds	1,352,124¶	1,945,249	43.9	248.9	274.7
80. Butter made on farms, pounds	19,161,385	34,766,409	81.4	3,527.5	4,909.7
81. Butter made in factories, pounds§	83,450	13,911,095	16,570.0	15.4	1,964.6
82. Total butter, pounds	19,244,835	48,677,504	152.9	3,542.9	6,874.2
83. Cheese made on farms, pounds	523,138	676,642	29.3	96.3	95.6
84. Cheese made in factories, pounds§	462,191	3,615,528	682.3	85.1	510.6
85. Total cheese, pounds	985,329	4,292,170	335.6	181.4	606.2
86. Milk produced on farms	(No report)	182,968,973	....	....	25,838.8
87. Milk sold, gallons	1,504,407	(No report)	....	276.9	....
88. Eggs produced, dozens	8,234,161	20,354,498	147.2	1,515.9	2,874.5
89. Beeswax, pounds	6,552	12,050	83.9	1.2	1.7
90. Honey, pounds	234,054	1,160,390	395.8	43.1	163.9
VIII. Value of:					
91. Farms, including fences and buildings	$193,724,260	$340,059,470	75.5	$35,663.98	$48,023.27
92. Live stock	31,904,821	57,725,683	80.9	6,873.58	8,152.03

*Sheep exclusive of spring lambs.
†Includes value of small fruits.
‡Exclusive of spring hatching.
¶Spring clip of 1880.
§The number of factories reported by the federal census as producing *cheese and butter* was 27 in 1880, and 115 in 1890; while the state statistics reported 49 *cheese factories* in 1880, and 121 *cheese factories* and 152 *creameries* in 1890.

Items	1880	1890	Percentage of increase or decrease	Per 100 of the country population	
				1880	1890
93. Implements and machinery	13,089,783	16,916,473	29.2	2,409.78	2,388.95
94. Cost of building and repairing fences	1,316,895	(No report)	....	242.43	....
95. Cost of fertilizers purchased	93,250	61,578	—33.9	17.17	8.70
96. Farm products	49,468,951	71,238,230	44.0	9,107.07	10,060.28
IX. Tenure of Farms:					
97. Total number of farms	92,386	116,851	26.5	17.0	16.5
98. Cultivated by owners, number	83,933	101,747	21.2	15.5	14.4
99. Cultivated by owners, percentage of total	90.85	87.07	—4.2	....	....
100. Rented for fixed money rental, number	1,251	3,421	173.5	.23	.48
101. Rented for fixed money rental, percentage of total	1.35	2.93	117.1	....	....
102. Rented for share of products, number	7,202	11,683	62.2	1.33	1.65
103. Rented for share of products, percentage of total	7.80	10.00	28.2	....	....

TABLE 18.—PROGRESS OF AGRICULTURE, 1890-1900

Items	1890	1900	Percentage of increase or decrease (a minus sign denotes decrease)	Per 100 of the country population	
				1890	1900
I. Population:					
1. Country population	708,114*	890,252	25.7	....	....
2. Town population	602,169	861,142	43.0	....	....
3. Total population	1,310,283	1,751,394	33.7	....	....
II. Acreage:					
4. Improved land	11,127,953	18,442,585	65.7	1,571.4	2,071.6
5. Unimproved land	7,535,692	7,805,913	3.6	1,064.2	876.8
6. Total land in farms	18,663,645	26,248,498	40.6	2,635.7	2,948.4
7. Number of farms	116,851	154,659	32.4	16.5	17.4
7a. Under 3 acres, number	(No report)	555	....	....	.1
7b. Under 3 acres, percentage of total farms	(No report)	.4	....	....	....
7c. Three and under 10, number	(No report)	1,994	....	....	.2
7d. Three and under 10, percentage of total farms	(No report)	1.3	....	....	....
7e. Total under 10 acres, number	812	2,549	213.9	.1	.3
7f. Total under 10 acres, percentage of total farms	.7	1.6	128.6	....	....
7g. Ten and under 20, number	1,210	2,254	86.3	.2	.3
7h. Ten and under 20, percentage of total farms	1.0	1.5	50.0	....	....
7i. Twenty and under 50, number	9,742	13,278	36.3	1.4	1.5
7j. Twenty and under 50, percentage of total farms	8.3	8.6	3.6	....	....
7k. Fifty and under 100, number	26,163	30,990	18.5	3.7	3.5
7l. Fifty and under 100, percentage of total farms	22.4	20.0	—10.7	....	....
7m. 100 and under 175, number	(No report)	56,785	....	....	6.4
7n. 100 and under 175, percentage of total farms	(No report)	36.7	....	....	....
7o. 175 and under 260, number	(No report)	24,933	....	....	2.8

*The country population for 1890 includes 8,457 persons reported from Indian Reservations. The statistics of agriculture for 1890 do not embrace Indian Reservations.

Items	1890	1900	Percentage of increase or decrease	Per 100 of the country population	
				1890	1900
7p. 175 and under 260, percentage of total farms	(No report)	16.1	....	....	....
7q. 260 and under 500, number	(No report)	20,540	....	....	2.3
7r. 260 and under 500, percentage of total farms	(No report)	13.3	....	....	....
7s. Total 100 and under 500, number.	77,048	102,258	32.8	10.9	11.5
7t. Total 100 and under 500, percentage of total farms	65.9	66.1	.3	....	....
7u. 500 and under 1,000, number	1,594	2,965	86.0	.2	.3
7v. 500 and under 1,000, percentage of total farms	1.4	1.9	35.7	....	....
7w. 1,000 and over, number	282	365	29.5	.04	.04
7x. 1,000 and over, percentage of total farms	.2	.2	....	....	....
7y. Percentage of all farm land improved	59.6	70.3	18.0	....	....
7z. Percentage of total land area in farms	36.1	50.7	40.5	....	....
8. Average size of farms, acres	159.7	169.7	6.3	....	....
9. Average improved land per farm, acres	95.2	119.2	25.3	....	....
III. Farm Products:					
10. Wheat, acres	3,372,627	6,560,707	99.5	476.3	736.9
11. Wheat, bushels	52,300,247	95,278,660	82.2	7,385.9	10,702.4
12. Oats, acres	1,579,258	2,201,325	39.4	223.0	247.3
13. Oats, bushels	49,958,791	74,054,150	48.2	7,055.2	8,318.3
14. Barley, acres	358,510	877,845	144.9	50.6	98.6
15. Barley, bushels	9,100,683	24,314,240	167.2	1,285.2	2,731.2
16. Rye, acres	62,869	118,869	89.1	8.9	13.4
17. Rye, bushels	1,252,663	1,866,150	49.0	176.9	209.6
18. Buckwheat, acres	22,090	6,700	—69.7	3.1	.8
19. Buckwheat, bushels	281,705	82,687	—70.7	39.6	9.3
20. Total, small grains, acres	5,395,354	9,765,446	81.0	761.9	1,096.9
21. Total, small grains, bushels	112,894,089	195,595,887	73.3	15,942.9	21,970.8
22. Corn, acres	901,690	1,441,580	59.9	127.3	161.9
23. Corn, bushels	24,696,446	47,256,920	91.4	3,487.6	5,308.3
24. Peas, acres	(No report)	670	....	....	.08
25. Peas, bushels	8,965†	9,021	.6	1.3	1.0
26. Beans, acres	(No report)	3,290	....	....	.4
27. Beans, bushels	61,009	36,317	—40.4	8.6	4.1
28. Irish potatoes, acres	105,880	146,659	38.5	15.0	16.5
29. Irish potatoes, bushels	11,155,707	14,643,327	31.2	1,575.4	1,644.8
30. Sweet potatoes, acres	7	4	—42.9	.001	.0005
31. Sweet potatoes, bushels	365	136	—62.8	.052	.015
32. Flaxseed, acres	303,635	566,801	86.7	42.9	63.7
33. Flaxseed, bushels	2,721,987	5,895,479	112.9	384.4	662.2
34. Clover seed, bushels	87,240	8,034	—90.8	12.3	.9
35. Grass seed, bushels	507,459	553,939	9.2	71.7	62.2
36. Peanuts, acres	7	None	....	.001	....
37. Peanuts, bushels	145	None	....	.020	....
38. Total, bushel crops, bushels	152,133,502	263,999,060	73.5	21,484.3	29,654.4

†In addition 1,288 bushels of cow peas are reported.

Items	1890	1900	Percentage of increase or decrease	Per 100 of the country population	
				1890	1900
Hay and Forage Crops:					
39. Wild salt and prairie grasses, acres.	(No report)	2,196,623	....	....	246.7
39a. Wild salt and prairie grasses, tons.	(No report)	2,842,243	....	....	319.3
40. Millet and Hungarian grass, acres.	(No report)	58,339	....	....	6.6
41. Millet and Hungarian grass, tons.	(No report)	93,954	....	....	10.6
42. Alfalfa, acres	(No report)	658	....	....	.07
43. Alfalfa, tons	(No report)	1,781	....	....	.20
44. Clover, acres	(No report)	74,669	....	....	8.4
45. Clover, tons	(No report)	128,767	....	....	14.5
46. Other tame and cultivated grasses, acres	(No report)	754,246	....	....	84.7
47. Other tame and cultivated grasses, tons	(No report)	1,114,459	....	....	125.2
48. Total cultivated hay, acres	(No report)	887,912	....	....	99.7
49. Total cultivated hay, tons	(No report)	1,338,961	....	....	150.4
50. Grains cut green for hay, acres	(No report)	26,304	....	....	3.0
51. Grains cut green for hay, tons	(No report)	45,633	....	....	5.1
52. Forage crops sown for forage, acres	(No report)	46,851	....	....	5.3
53. Forage crops sown for forage, tons.	(No report)	112,500	....	....	12.6
54. Corn stalks, tons	(No report)	72,339	....	....	8.1
55. Total hay and forage, acres	2,709,191	3,157,690	16.5	382.6	354.7
56. Total hay and forage,* tons	3,135,241	4,339,337	38.4	442.2	487.4
57. Tobacco, acres	49	117	138.9	.007	.01
58. Tobacco, pounds	23,285	127,730	448.5	3.3	14.3
59. Hops, acres	2	Less than 1 acre	....	.0003	Less than .0001
60. Hops, pounds	500	51	—89.8	.07	.006
61. Flax fiber, pounds	8,609	(No report)	....	1.2	....
62. Flax straw, tons	31,163	(No report)	....	4.4	....
63. Broom corn, acres	80	149	86.2	.011	0.17
64. Broom corn, pounds	42,090	76,960	82.8	5.9	8.6
65. Maple sugar, pounds	34,917	29,580	—15.3	4.9	3.3
66. Maple syrup, gallons	12,091	1,079	—91.1	1.7	.12
67. Sorghum syrup, gallons	340,792	157,605	—53.8	48.1	17.7
68. Sorghum cane sold for sugar making, tons	593	1,232	107.8	.08	.14
69. Sorghum, acres	3,890	2,283	—41.3	.54	.25
70. Sorghum, product in tons	(No report)	14,369	....	....	1.6
71. Market gardening, value of products	$612,451	(No report)	....	$86.49	....
72. Forest products, value	(No report)	$2,602,335	....	....	$292.32
73. Orchard trees, number bearing	215,381	1,096,444†	409.1	30.4	123.2
74. Orchard fruits, bushels	85,603	143,655	67.8	12.1	16.1
75. Orchard products, value	(No report)	$109,050	....	....	$12.25
76. Nursery trees and plants, acres bearing	809	1,127	39.3	.11	.13
77. Seed farms, acres planted	856	(No report)	....	.12	....
78. Florists' establishments, area under glass, square feet	408,612	889,986	117.8	57.7	99.9
79. Small fruits, acres	(No report)	3,092	....	....	.35
80. Small fruits, quarts	(No report)	4,542,640	....	....	510.2
81. Small fruits, value	(No report)	$339,569	....	....	$38.14

*Exclusive of corn stalks.
†Apparently includes young trees not yet bearing.

Items	1890	1900	Percentage of increase or decrease	Per 100 of the country population	
				1890	1900
82. Grapes, number of vines	(No report)	138,175	....	....	15.6
83. Grapes, pounds	(No report)	573,272	....	....	64.4
84. Grapes, value of product (including raisins and wine)	(No report)	$15,593	....	....	$1.75
IV. Live Stock on Farms:					
85. Horses, number	461,509	696,469	50.9	65.2	78.2
86. Horses, value	(No report)	$42,255,044	....	....	$4,746.41
87. Mules and asses, number	9,511	8,500	—10.7	1.3	.96
88. Mules and asses, value	(No report)	$498,055	....	....	$55.95
89. Milch cows	593,908	(No report)	....	83.9	....
90. Working oxen	32,505	(No report)	....	4.6	....
91. Cattle, other than milch cows and working oxen	747,166	(No report)	....	105.5	....
92. Calves under 1 year, number	(No report)	565,994	....	....	63.6
93. Calves under 1 year, value	(No report)	$4,254,414	....	....	$477.89
94. Steers, number	(No report)	229,423	....	....	25.8
95. Steers, value	(No report)	$4,289,461	....	....	$481.82
96. Bulls 1 year and over, number	(No report)	42,549	....	....	4.8
97. Bulls 1 year and over, value	(No report)	$1,202,197	....	....	$135.04
98. Heifers 1 year and under 2 years, number	(No report)	211,162	....	....	23.8
99. Heifers 1 year and under 2 years, value	(No report)	$3,299,865	....	....	$370.67
100. Dairy cows 2 years and over, number	(No report)	753,632	....	....	84.7
101. Dairy cows 2 years and over, value	(No report)	$21,513,337	....	....	$2,416.55
102. Other cows 2 years and over, number	(No report)	68,565	....	....	7.7
103. Other cows 2 years and over, value	(No report)	$1,689,684	....	....	$189.80
104. Total neat cattle, number	1,373,579	1,871,325	36.2	194.0	210.2
105. Total neat cattle, value	(No report)	$36,248,958	....	....	$4,071.76
106. Sheep, number	399,049	589,878	47.8	56.4	66.3
107. Sheep, value	(No report)	$1,740,088	....	....	$195.46
108. Goats, number	(No report)	3,821	....	....	.44
109. Goats, value	(No report)	$12,908	....	....	$1.45
110. Swine, number	853,715	1,440,806	68.8	120.6	161.8
111. Swine, value	(No report)	$5,865,590	....	....	$658.87
112. Total live stock, number	3,097,363	4,610,799	48.9	437.4	517.9
113. Total live stock, value	(No report)	$86,620,643	....	....	$9,729.90
V. Poultry on Farms:					
114. Chickens	4,448,831	7,730,940	73.8	628.3	868.4
115. Turkeys	151,459	193,143	27.5	21.4	21.7
116. Geese	69,224	90,975	31.4	9.8	10.2
117. Ducks	74,697	127,635	70.8	10.5	14.3
118. Total poultry, number	4,744,211‡	8,142,693†	71.6	670.0	914.6
119. Total poultry, value	(No report)	$2,274,649	....	....	$255.51
VI. Animal Products:					
120. Number of fleeces of wool shorn	312,861	376,009	20.2	44.2	42.2
121. Wool, pounds	1,945,249	2,612,737*	34.3	274.7	293.5

*Weight in pounds of unwashed fleeces.
†Includes only fowls three months and over.
‡Exclusive of spring hatching.

Items	1890	1900	Percentage of increase or decrease	Per 100 of the country population 1890	Per 100 of the country population 1900
122. Wool, value	(No report)	$460,305	....	....	$51.71
123. Mohair, fleeces shorn	(No report)	350	....	....	.04
124. Mohair, pounds	(No report)	556	....	....	.06
125. Mohair, value	(No report)	$180	....	....	$0.02
126. Butter, pounds made on farms	34,766,409	41,188,846	18.5	4,909.7	4,626.7
127. Butter, pounds sold from farms	(No report)	22,376,084	....	....	2,513.5
128. Butter, pounds made in factories§	13,911,095	41,174,469	196.0	1,964.6	4,625.0
129. Total butter, pounds	48,677,504	82,363,315	69.2	6,874.2	9,251.7
130. Cheese, pounds made on farms	676,642	290,623	—57.0	95.6	32.6
131. Cheese, pounds sold from farms	(No report)	227,878	....	....	25.6
132. Cheese, pounds made in factories§	3,615,528	3,285,019	—9.1	510.6	369.0
133. Total cheese, pounds	4,292,170	3,575,642	—16.7	606.2	401.6
134. Milk, gallons produced	182,968,973	304,017,106	66.2	25,838.8	34,149.6
135. Milk, gallons sold	(No report)	103,768,172	....	....	11,656.0
136. Cream, gallons sold	(No report)	1,205,845	....	....	135.4
137. Dairy products, value of all	(No report)	$16,623,460	....	....	$1,867.28
138. Dairy products, value of those consumed on farms	(No report)	$5,508,769	....	....	$618.79
139. Eggs produced, number in dozens	20,354,498	43,208,130	112.3	2,874.5	4,853.5
140. Poultry raised, value of	(No report)	$2,927,717	....	....	$328.87
141. Bees, swarms	(No report)	45,877	....	....	5.2
142. Bees, value	(No report)	$167,280	....	....	$18.79
143. Beeswax pounds	12,050	20,626	71.2	1.7	2.3
144. Honey, pounds	1,160,390	986,446	—14.9	163.9	110.8
VII. Value of:					
145. All farm property	$414,701,626	$788,684,642	90.6	$58,564.25	$88,591.17
146. Land and improvements (minus buildings)	(No report)	$559,301,900	....	....	$62,825.12
147. Buildings	(No report)	$110,220,415	....	....	$12,380.81
148. Farms, including buildings	$340,059,470	$669,522,315	96.9	$48,023.27	$75.205.93
149. Implements and machinery	$16,916,473	$30,099,230	77.9	$2,388.95	$3,380.98
150. Live stock	$57,725,683	$89,063,097	54.3	$8,152.03	$10,004.26
151. Fertilizers purchased	$61,578	$251,120	307.8	$8.70	$28.21
152. Wages paid	(No report)	$16,657,820	....	....	$1,871.14
153. Value of products fed to live stock	(No report)	$33,257,480	....	....	$3,735.74
154. Value of products not fed	(No report)	$127,959,824	....	....	$14,373.44
155. Total value of farm products	$71,238,230	$161,217,304	126.3	$10,060.28	$18,109.18
VIII. Tenure:					
Total number of farms (item 7)	116,851	154,659	32.4	16.5	17.4
156. Cultivated by complete owners, number	(No report)	111,248	....	....	12.5
157. Cultivated by complete owners, percentage of total	(No report)	71.9	....	....	....
158. Cultivated by part owners, number	(No report)	14,805	....	....	1.7
159. Cultivated by part owners, percentage of total	(No report)	9.6	....	....	....

§The number of factories producing cheese and butter was:

	In 1890	In 1900
By Census:		
Cheese factories Butter factories	115*	396*
By State Dairy Commissioner:		
Cheese factories	121	....
Butter factories	152	....

*Grouped as "establishments producing cheese and butter."

Items	1890	1900	Percentage of increase or decrease	Per 100 of the country population	
				1890	1900
160. Cultivated by owners and tenants, number	(No report)	756	....	....	.1
161. Cultivated by owners and tenants, percentage of total	(No report)	.5	....	....	....
162. Total cultivated by owners, number	101,747	126,809	24.6	14.4	14.2
163. Total cultivated by owners, percentage of total	87.1	82.0	—9.4	....	....
164. Cultivated by managers, number	(No report)	1,095	....	....	.08
165. Cultivated by managers, percentage of total	(No report)	.7	....	....	....
166. Cultivated by cash tenants, number	3,421	5,129	49.9	.48	.58
167. Cultivated by cash tenants, percentage of total	2.9	3.3	13.8	....	....
168. Cultivated by share tenants, number	11,683	21,626	85.1	1.65	2.43
169. Cultivated by share tenants, percentage of total	10.0	14.0	40.0	....	....

CHAPTER VI

RECENT TENDENCIES IN AGRICULTURE

Weather and insects, 1900-1913

The summer of 1900 was one of the warmest on record, almost equaling 1881 and 1894 (Fig. 101). In the spring there was also drought, followed by heavy, and in places excessive, rains from July to September.[1] The season of 1901 was favorable up to midsummer, but torrential rains later in the season, together with early frosts, caused losses in some districts (Figs. 100, 21). Insects were also troublesome, especially the chinch-bugs in the south central section, the Hessian fly wherever wheat was grown, and the Rocky Mountain locust (grasshopper) in the Red River Valley from Wilkin to Kittson County.[2] From 1902 to 1906 the annual rainfall was above the average (Figs. 22, 100), and there were occasional complaints (as in 1903) of early frosts.[3] On the whole, however, while the annual temperature was below normal in 1903 and 1904, the average growing season for the State as a whole was unusually long, from 1903 to 1906 inclusive (Figs. 12, 21). In 1903, however, the lesser migratory locust caused damage in Otter Tail County, and also near Crookston, where some tracts had been left unplowed; while the Hessian fly, favored by moisture, destroyed not less than eight per cent of the wheat crop, notably in the west and southwest. Chinch-bugs, although held in check somewhat by rain, caused loss on warm sandy soils, attacking especially wheat, barley, and, later in the season, corn.[4] The Hessian fly continued to be destructive in 1903, but even this was less in evidence during the cool season of 1904.[5] On the other hand, some districts were affected by rot and blight;[5] and the heavy rains flooded considerable areas, especially during 1906 in the Red River Valley.[6] In 1907, as in 1903 and 1904, the average annual temperature dropped below normal, being low at all seasons (Figs. 12, 101). At the same time the average growing season was cut short by a late spring, falling to 118 days (Fig. 21). These variations were, however, less disastrous than might have been expected, because the precipitation also fell somewhat below normal, enabling a smaller amount of heat to exert a greater effect on vegetation. In 1908 both temperature and precipitation somewhat exceeded normal; in 1909 the temperature was a trifle below normal, while precipitation remained abundant (Figs. 12, 22). In both years the growing season exceeded the average in length (Fig. 21). These two years were consequently among the most favorable for crops on record.[7] In 1910, however, came a season of unexampled drought, the average precipitation for the year being less than fifteen inches. Moreover, in spite of the high average temperature, the growing season was relatively short (Figs. 12, 21). The deficiency of rainfall in 1910 was in large measure offset by an excess in 1911, though not until disastrous results had followed. The temperature was lower in 1911 and especially in 1912, but rose in 1913 to approximately the same point as in 1910, though with very different results owing to the larger rainfall.

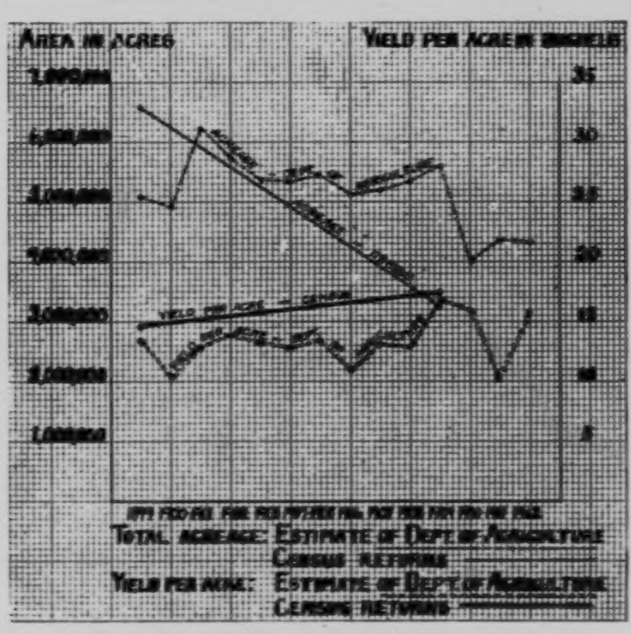

Figure 159. Acreage and acre yield of wheat, 1899-1912.[9]

During 1909 and especially during the dry season of 1910, damage was again reported from grasshoppers in the Red River Valley, particularly near large tracts of unplowed land which served as hatching places. As these tracts were held by non-resident owners, they unfortunately could not, under the law, be plowed at the expense of the owners.[8]

Defects of recent statistics

The series of Minnesota Statistics came to an end in 1898, owing to opposition in the legislature. For this reason it is impossible to trace the development of agriculture in the State as clearly during the last decade as during any previous period after 1858, aside from the period of the Civil War when the state statistics were likewise discontinued.

Owing to the absence of state statistics, it is necessary to rely, for the last decade, chiefly on the federal census, which covers only the crop years 1899 and 1909; together with the estimates published by the United States Department of Agriculture. These estimates, however, being based on the guesses of local observers, are of little value so far as concerns acreage in the several crops. This fact was strikingly shown when the department estimated for 1909 nearly double the acreage of wheat in Minnesota which was found by the census for the same year (Fig. 159). It is evidently hopeless to attempt to calculate, from figures having such a margin of error, the percentage of tilled land in various crops from year to year. However, local observers are able to ascertain, from threshers' reports, average yields much more closely than acreage; and the acre yields published by the department may consequently be used with some confidence.

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[1] *Eighth Report Agr. Exp. Sta.*, VII.
[2] *Ninth Report Agr. Exp. Sta.*, VI, X-XIII; *Tenth Report*, XVIII.
[3] *Eleventh Report, Agr. Exp. Sta.*, 9.
[4] *Eleventh Report, Agr. Exp. Sta.*, 22-23; *Insects Injurious in 1903*, 12-18.
[5] *Thirteenth Report, Agr. Exp. Sta.*, VIII, 11-15.
[6] *Sixteenth Report, Agr. Exp. Sta.*, 5-10.
[7] *Nineteenth Report, Agr. Exp. Sta.*, 167-171.
[8] *Ibid.*, 74-75.
[9] Census of 1900 and 1910; U. S. Dept. of Agriculture. Statistics Bul. 57 and Year Books 1909-1912 inclusive.

This conclusion is confirmed, in the case of wheat, by comparing the census figures of total acreage and average yield, with the estimates of the Department of Agriculture.

Yield and price of wheat, 1900-1912

According to the census the average yield of wheat in Minnesota was 14.5 bushels per acre in 1899 and 17.4 bushels in 1909; an increase of 20 per cent (Fig. 102). The estimates of the Department of Agriculture ran a little lower, but showed substantially the same ratio of increase. According to these estimates the drought of 1900 and the floods of 1906 both resulted in partial crop failures; while the great drought of 1910, leaving the soil exhausted of moisture, was largely responsible for a still more disastrous failure in 1911. With these exceptions, the average yields per acre exceeded 12 bushels each year, being highest in the census year 1909.

In this connection it is significant that investigations by the Agricultural Experiment Station covering the period 1902-1907 found 12 bushels per acre to be the minimum crop of wheat which would yield a profit under modern conditions. For the ten-year period 1900-1909 the average yield for Minnesota shown by the estimates of the Department of Agriculture was 13 bushels per acre. The margin above the cost of production of wheat since 1900 has thus been somewhat narrow.

On the other hand, in contrast to the period from 1880 to 1896, the general tendency of wheat prices since 1900 has been upward, except for the two years 1906 and 1907. This movement, like the acre yield, also reached its climax in 1909 (Fig. 75).

Proportion of land under each crop

While changes from year to year can not be ascertained since 1898, owing to the unfortunate discontinuance of the state statistics, it is possible, by using the census figures, to ascertain roughly the use of the tilled land down to 1909 (Figs. 74, 104). The proportion of tilled land in grains was higher in 1860 than in any subsequent year so far as reported. In 1883 this proportion dropped below 90 per cent, and in 1910 for the first time the census showed less than 80 per cent of the tilled land in grains. The land lost by the cereals largely went to cultivated hay and fodder crops, flax, potatoes, and pasture (Figs. 74, 104).

The phenomenal rise previously noted from 1895 to 1899 (page 137) had carried the area in wheat up to 6.6 million acres, or 50.69 per cent of all tilled land. It may reasonably be assumed that after 1899, as in previous decades, the acreage under wheat continued to vary directly with the acre yield and with the price. On this basis the low prices and crop failures of 1900 and 1906 presumably tended to reduce, while the relatively good crops and high prices of 1905, 1908, and 1909 tended to increase, the acreage planted to wheat in subsequent years (Figs. 75, 102). In spite of this stimulus the area in wheat had shrunk, by 1909, from 6.6 million acres, or 50.7 per cent of all tilled land, to 3.3 million acres, or 25.7 per cent of such land. In view of these figures it is manifest that, while agriculture still remained the greatest single industry, wheat growing had definitely ceased to be the dominant type of agriculture. King Wheat, after a reign of more than forty years in Minnesota, had finally been dethroned.

The land lost by wheat was largely planted to oats, corn, barley, and rye, which have always gained whenever wheat lost (Figs. 74, 104). Oats, indeed, held in 1909 but little less land than wheat, and may eventually become the premier grain crop of the State. Still more significant, however, was the rapid increase of cultivated hay, which means rotation of crops and a corresponding expansion of animal industries.

Distribution of improved land in 1910

Improved land was still very unequally distributed throughout the State, and this fact underlay the unequal distribution of crops and of values. From Fillmore County north and west to Clay County the proportion of total area improved was from 60 to 90 per cent except for several river counties and the belt from Stearns to Otter Tail which includes the Leaf Hills moraine (Fig. 161). East of the Mississippi, on the other hand, only three counties had 40 per cent and only seven had 20 per cent of their area improved for farming purposes. In practically all of the coniferous region the proportion of improved land was less than 10 per cent; and in most of it less than 1 per cent. The complete contrast which the coniferous region thus offered to the early settlement and rapid development of the broad-leaved timber belt and of the prairies is most striking.

Distribution of small grains according to the census of 1910

In 1909, as reported at the census of 1910, wheat had ceased to be an important factor in the crop system of both the southeastern and the southwestern counties (Figs. 162, 163). In the two southern tiers of counties only the strip of relatively low land with heavy soil running south from the big bend of the Minnesota—once the channel by which the great glacier moved south into Iowa—continued to grow wheat in considerable amounts. The bulk of the wheat crop reported by the census of 1910 thus came from the Minnesota and the Red River Valleys. In recent years winter wheat, which yields more to the acre, has made some progress in the south and even as far north as Crookston. It is frequently planted in standing corn, which tends to hold the snow.[11]

Oats, in addition to being generally grown for local use, were cultivated more intensively in several distinct areas: one in Dakota and Washington counties near the large cities, another in Mower County on the highest part of the southeastern plateau. Both of these corresponded to the distribution in 1900. There was also apparently the beginning of a third oats district, as yet less clearly defined, in the southwestern Coteau section. The explanation of this distribution is somewhat complex. In view of the bulky character of oats, this crop, like potatoes, pays better near the city markets. On the other hand, warm nights tend materially to lessen the yield of oats; hence it may reasonably be inferred that the upland districts named are better suited to oats than to most other cereals. Oats are also the principal grain crop of the coniferous zone,[12] partly for climatic reasons, partly because the lumber and mining industries furnish markets near at hand (Figs. 164, 165).

Barley showed a much wider spread in 1909 than in 1899, being of some importance in all parts of the agricultural zone

[10] Bul. 117, 45.
[11] *Seventeenth Report, Agr. Exp. Sta.*, 378.
[12] *Eleventh Report, Agr. Exp. Sta.*, 182.

(Figs. 139, 166). The areas of most intensive culture were found in the southeastern counties, which originally led in wheat, and also in the southwestern district. There barley apparently competed for the soil with oats; Martin County, for example, having much oats and little barley, while others reversed these proportions.

Compared to other cereals, aside from buckwheat, barley has the advantage of ripening in a shorter season and therefore escaping late droughts. Both barley and oats, the one doing well in a cooler season and the other ripening in a briefer period, seem better adapted to upland situations, and also to the northern half of the State east of the Red River lowlands, than either wheat or corn.

Rye, like barley, spread widely between 1899 and 1909, replacing wheat on considerable land (Figs. 141, 168, 169). The center of density was still in the potato and oats region near the Twin Cities, but extended also toward the northwest in the hardwood belt from Stearns to Otter Tail County. Of all cereals grown in Minnesota rye is best adapted to a sandy soil. Moreover the winter variety, being fall-sown and harvested in July, before either winter wheat or barley, usually escapes summer droughts. It has also the further advantage of furnishing late fall and early spring pasturage, and of spreading farm labor over a larger part of the year. Finally, rye is a good stock food, largely takes the place of wheat in breadmaking whenever wheat flour is expensive, and yields more to the acre than wheat, especially if the value of the straw be included.[14] For all these reasons a considerable development of rye culture would appear to be in the line of economic advantage, especially on the cut-over timber lands in the northern half of the State.

Buckwheat, being to a considerable extent a catch crop, planted after a failure of some other crop to make a good stand, fluctuates considerably from year to year, both as to amount and location. In the 1909 season, six counties grew as much as 10,000 bushels each, five of them being in the southeast and one (Polk) in the northwest. The largest crop was in Mower (Fig. 170).

More important than buckwheat are two grains recently introduced by the Department of Agriculture for use as stock feed: emmer, which is highly drought-resistant, and spelt, a cereal of the wheat family but encased, like oats, in a close-fitting husk. In 1909 there were two distinct areas of emmer and spelt growing: one in the southeast, where the crops were presumably an adjunct to the dairy industry; and another in the southwest. There was also some production in most of the western counties (Fig 171).

Field beans and peas, planted and harvested like small grain, are a considerable factor in the crop system of other states, notably Michigan, which are located on the northern edge of the corn belt; but in spite of occasional spurts, neither has become of such importance in Minnesota as to be shown on a map using the same unit as other bushel crops. In 1909 the principal producing counties were as follows (Table 19):

TABLE 19.—ACREAGE AND YIELD OF FIELD PEAS AND BEANS IN 1909

Counties	Peas acres	Peas bushels	Counties	Beans, acres	Beans, bushels
Benton	44	804	Aitkin	75	1,955
Carlton	38	453	Anoka	294	2,620
Houston	100	1,384	Becker	51	1,058
Nicollet	16	510	Benton	73	817
Olmsted	22	513	Cass	53	883
Otter Tail	84	1,573	Chisago	108	1,708
Pine	38	645	Crow Wing	147	1,874
Ramsey	44	681	Hubbard	135	1,560
Saint Louis	92	1,324	Isanti	1,448	16,230
Sherburne	43	922	Morrison	61	1,350
Stearns	131	3,344	Otter Tail	258	3,946
All others	183	2,811	Pine	57	1,321
			Polk	158	2,705
			Sherburne	78	907
			Todd	491	5,165
			Washington	124	2,430
			All others	1,086	16,293
State	835	14,964	State	4,697	62,822

Peas are the hardier but require heavy soil; with the result that though they were little grown in the prairie region, where small grains had the preference, most of the producing counties, aside from Carlton and Pine, were in the hardwood zone. On the other hand, beans do well on sandy loams but are very susceptible to late frosts. The principal region of production, therefore, lay east of the Mississippi, especially in Isanti County. The production of beans is more than four times as large as that

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[13] *Eleventh Report, Agr. Exp. Sta.*, 102.
[14] *Bul. 180, Agr. Exp Sta.*, 3-4.

of peas; but this crop, like rye, seems capable of a far greater development in the cut-over region east of the Mississippi, unless, indeed, late frosts prove a serious obstacle.

Distribution of corn according to the census of 1910

Corn continued to spread northward during the decade. The area of greatest density, which in 1899 was limited to the southern tier of counties, by 1909 had advanced at least two tiers of counties, extending well toward the headwaters of the Minnesota. Moreover, the Squaw and Flint varieties characteristic of frontier agriculture had largely given way to the more productive Dent corn.[15] In fact, it may fairly be claimed that corn has completed the conquest of the State, aside from the north shore of Lake Superior; since, according to the census of 1910, corn of some sort was grown in every county but two.[16] It however remains to be determined how far north corn is likely to become a commercially important crop.

One important factor in corn growing, which some investigators consider the principal determinant of fat or lean crops, is the rainfall during June and July.[17] On this basis, in normal years all Minnesota can readily qualify as a part of the corn belt, since three fourths or more of the annual precipitation falls in the three summer months (Fig. 23). Moreover, the heaviest rainfall is in June, when most needed, and the next heaviest in July.

The other important factor is of course the temperature. Corn, being of semitropical origin, requires more heat than most crops of the temperate zone. Abbe, indeed, declares the gorwth of corn to be practically proportional to the accumulated excess of temperature above the germinating point, which for corn is given as approximately 50 degrees F.[18] However it may be about growth, this rule clearly does not hold as to yield. From 1900 to 1909 inclusive the average yield of corn in Minnesota, as reported by the Department of Agriculture, was 29.4 bushels per acre, which far exceeded the yield in any of the states south of the Potomac and Ohio, or in Texas, Oklahoma, Missouri, Kansas, Nebraska or South Dakota. Even Iowa, as famous for corn as Minnesota for wheat, led Minnesota by only 2.9 bushels per acre[19] (Fig. 160).

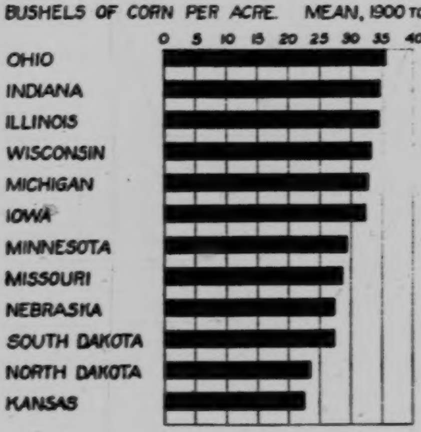

Figure 160. Comparative yields of corn per acre in the principal corn-growing states, 1900-1909.

During the early years in Minnesota it was supposed that the isotherm of 70° F. for June, July, and August marked the northern limit of corn as a leading crop; but at present practically the entire Wisconsin corn district, as well as a considerable part of Iowa, lies beyond this line.[20]

Again, butter production in Wisconsin is said to be more profitable in the corn belt, and cheese production farther north; at the same time it appears that cheese factories in Wisconsin are found chiefly north of the district having a growing season of 150 days.[21] This would seem to identify the zone of 150 growing days as the northern limit of the corn belt. In point of fact, however, while the greatest density of corn production in Wisconsin is found in this zone, corn has long since passed beyond these limits, even in that State; while in Minnesota there is no evidence of any relation between a season of 150 days and corn growing, unless it be that Martin County, which grew the most corn in 1909, has such a season; but so also have several other counties in the southeast and the east, which grow relatively little corn (Figs. 172, 173).

One reason for this northward extension of the corn belt, beyond the latitude once thought suitable, is the greater duration of summer sunshine in high latitudes, which forces vegetation to an extraordinarily rapid growth. During the three summer months the sun is above the horizon 1,403.8 hours at Crookston and 1,373.5 at St. Paul, against 1,355 hours at Milwaukee and 1,337.2 hours at Peoria, in the heart of the Illinois corn country.[22] Further, the proportion of actual to theoretically possible hours of sunshine is greater, and the average temperature of summer is therefore higher, in Iowa and Minnesota than at the same latitude and elevation in the vicinity of Lake Michigan. For example, at St. Paul there were 1,006 hours of actual sunshine in June, July, and August, 1911, against 853 hours in the same three months at Milwaukee. The ratio of actual to possible sunshine was thus 73 per cent at St. Paul, but only 63 per cent at Milwaukee. Finally, in spite of the heavy summer rainfall, the air is less moist in most of Minnesota than it is farther east; and while air so dry as to permit a rapid radiation of heat, and consequently, cool nights, is unfavorable to corn, yet short of this point, the drier the air the more rapidly corn will mature.[23]

These favorable influences extend in a measure to all parts of the State; yet it is a fact, and one to which special attention has been called by Professor C. P. Bull, that the acre yields of corn average much larger in the southern than in the northern counties.[24] It is also a fact, as reported by the federal census, that in 1909 relatively little corn was grown north of Otter Tail County, except in the lower river valleys (Fig. 172). The explanation is not far to seek. In the northern half of the State earliness of maturity and heaviness of yield seem to vary inversely;[25] and while corn can be grown almost everywhere, it does not follow that corn is everywhere the most profitable crop to grow, even for stock feed. The practical limit is thus drawn by economic considerations rather than directly by climate. There are, however, good Dent varieties ripening in 110 to 115 days, and these can be matured with reasonable certainty wherever the average growing season is 130 days. Even the shorter seasons at such places rarely prove insufficient to mature the crop. In Minnesota the line marking an average season of 130 days seems to bear some relation to the isotherm of 65° F. for the three summer months, avoiding, however, the plateau in the north central section above the 1,250-foot contour line (Figs. 16, 4). Most of the zone having 130 growing days also lies south of the line indicating September 15 as the average date of the first killing frost in autumn. In the region beyond the 130-day zone, barley now largely serves as stock feed, in lieu of corn; being supplemented by rye, field peas, clover, and root crops.[26] This is, moreover, the approved agricultural practice, as appears from the four-year rotations recommended by the Agricultural Experiment Station for this section, which are (1) oats, barley, clover, fodder corn; (2) barley, clover, field peas (on heavy soil), root crops.[27]

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[15] *Eleventh Report, Agr. Exp. Sta.*, 213-214; *Sixteenth Report*, 177-178; *Seventeenth Report*, 389-390.
[16] Boss, A., *Northward Movement of the Corn Belt* (*Proceedings Minnesota Agricultural Society*, 1911, 257-259).
[17] Smith, J. W., *Relation of Precipitation to the Yield of Corn* (*Year Book, U. S. Dept. of Agriculture*, 1903); Arctowski, H., *Studies on Climate and Crops* (*Bulletin of Am. Geog. Soc.*, October, 1912).
[18] Abbé, Cleveland. *Relation Between Climate and Crops*, 335 (*Bul. 36, Weather Bureau*).
[19] Data from *Year Book, U. S. Dept. of Agriculture*.
[20] *Bul. 200 Bureau of Plant Industry*, Plate 11.
[21] *Bul. 201, Wis. Agr. Exp. Sta.*, 6; *Bul. 210*, maps 6, 17.
[22] Data from U. G. Purssell, Director U. S. Weather Bureau at Minneapolis.
[23] *Eleventh Report Agr. Exp. Sta.*, 213-214.
[24] *Minnesota's Resources*, 9 (State Board of Immigration, St. Paul).
[25] *Sixteenth Report, Agr. Exp. Sta.*, 177.

Distribution of non-cereal field crops according to the census of 1910

Flax, planted for seed, also moved northward (Figs. 174, 176). There was an increase in the northern part of the Red River Valley, but from Clay County south a marked decline had occurred. South of the Minnesota flax was still grown to a limited extent in the group of counties from Mower and Fillmore to Goodhue, and also more extensively in the southwestern prairie district, but from the intervening south central counties it had practically disappeared. The explanation of this decline is probably the deleterious effect which repeated crops of flax exercise upon the soil.

Potatoes were grown less extensively in many parts of the State than ten years before (Figs. 175, 177), presumably because of the further development of specialized potato growing in the two districts previously noted—one adjacent to and mainly north of the Twin Cities, the other in Clay County. Potato culture had also spread considerably toward the north, east of the Mississippi; and there were indications of a similar development in the hardwood belt between Sherburne and Otter Tail counties, precisely as in the case of rye. In fact, throughout the northern half of the State, aside from the Red River Valley, potatoes, since they flourish on light soils and mature in a season of 100 days or even less, are in process of becoming the principal money crop.[28]

The acreage and production of hay, including both wild and tame, showed the usual wide and fairly equal distribution. (Figs. 178, 179). Even cultivated hay, which had previously been substantially limited to the older districts, now extended over the entire agricultural zone, including portions of the coniferous region (Figs. 150, 179). There was, however, a district of greatest density, though no longer sharply defined, in Freeborn, Dodge, and the adjacent counties. This wide distribution of cultivated hay is one of the most striking evidences that by 1909 the one-crop system was no longer exclusively followed in any section of Minnesota.

In addition to the tame grass cut for hay, there were considerable areas of timothy, clover, and millet grown for seed, the yield being close to a million bushels and the value approximately 1.5 million dollars. Unfortunately no county statistics are available for these crops; but it is reliably reported that some of the larger farms in the southeastern counties specialize in timothy seed.[29] It is also well known that some farmers in the coniferous district, remote from railroads, grow clover seed because it has a larger value in a small bulk than any grain crop and is therefore more cheaply marketed.

Other special crops grown on a small scale in Minnesota are tobacco and sugar crops. Tobacco was reported for the 1909 season from 186 farms, the entire breadth being 150 acres. Evidently it was nowhere a major product, though there are large areas similar to the tobacco districts of Wisconsin. Unfortunately, there are no county statistics to show the location of the producing farms.

Syrup and sugar are derived, in Minnesota, from three sources: the maple tree, sorghum cane, and the sugar beet. The production of maple sugar and syrup has greatly declined since earlier decades, partly because maples grow on good land which is likely, unless very broken, to be more valuable for other purposes; partly because it has proved almost impossible to prevent the sale of imitation maple products. During the last decade, however, there was some recovery due to better enforcement of laws against adulteration (Table XXIII, Items 44, 45). In 1909 the principal area of production was still in the former "big woods" extending from Le Sueur and Rice to Wright and Hennepin, though some was produced as far north as Beltrami County (Fig. 180). Sorghum has likewise declined since the decade 1869-1879, the area of largest production being also in the "big woods" district where it now serves merely local use (Fig. 180). The most important commercially of the sugar crops, and, indeed, of all these special crops, is the sugar beet. Being planted largely under contract with the factory located at Chaska in Carver County, sugar beets were produced chiefly in the same group of counties as the other sugar crops, with the addition of several along the Mississippi (Fig. 180).

Distribution of fruit and vegetable crops in 1909

During the decade 1899 to 1909 there was an increase in vegetables other than potatoes from 28,361 to 46,021 acres, or 62.3 per cent; in flowers and nursery products, from 1,270 to 4,017 acres, or 216.3 per cent; in small fruits, from 3,092 to 3,738 acres, or 20.9 per cent; and in orchard fruits and nuts, for which no acreage statistics are available, from $125,240 to $813,971 in value of output, or 549.9 per cent (Table 24).

The counties having the largest acreage in vegetables other than potatoes were Dakota, Freeborn, Hennepin, Otter Tail, Ramsey, Stearns, Wabasha, and Wright. All of these except Otter Tail, as well as most of the others having upward of 500 acres each planted to vegetables, are located adjacent to important urban centers (Table 20). Otter Tail, which contains areas of light, warm soil, is well situated to serve as a source of vegetables for the adjacent regions of heavier and colder soils, especially in the Red River Valley.

[26] *Ibid.*, 69, 178; *Nineteenth Report, Agr. Exp. Sta.*, 389-390.
[27] *Seventeenth Report, Agr. Exp. Sta.*, 389-390.
[28] *Ibid.*, 805.
[29] *Bul. 117, Agr. Exp. Sta.*, 42.

TABLE 20.—ACREAGE IN VEGETABLES OTHER THAN POTATOES FOR 1909 (CENSUS OF 1910).

County	Acres	County	Acres
Beltrami	571	Polk	952
Blue Earth	898	Ramsey	1,644
Brown	523	Renville	708
Carver	729	Rice	767
Crow Wing	500	St. Louis	539
Dakota	2,116	Sibley	599
Faribault	532	Stearns	1,394
Fillmore	652	Todd	791
Freeborn	1,369	Wabasha	1,447
Goodhue	644	Washington	763
Hennepin	3,886	Winona	772
Le Sueur	565	Wright	1,035
McLeod	536	All others (having less than 500 acres each)	16,758
Morrison	659		
Mower	646	Total for State	46,021
Nobles	537		
Olmsted	627		
Otter Tail	1,192		
Pine	670		

The localization of vegetable growing has also been somewhat affected by the establishment of canning factories. As reported by the State Dairy and Food Department in 1910, there were 17 canneries in active operation and several others temporarily shut down (Fig. 181). The canning industry in Minnesota was by that date fairly past the experimental stage. The principal products canned were corn, peas, and beans; and it will be noted that the chief group of canneries was in the lower Minnesota valley,[30] which has the greatest density of country population and the largest value of farm products.

Small fruits, comprising chiefly strawberries, raspberries, and currants, mature readily in all parts of the State, though raspberries require some protection in winter.[31] Nevertheless, by reason of transportation charges there was a marked concentration in the southeastern quarter of the State, adjacent to the Twin Cities, Stillwater, Winona, Red Wing, and Mankato (Fig. 182).

Orchard fruits as reported by the census of 1910 showed a somewhat similar, though less clearly marked, localization (Fig. 183). All are planted by preference on fairly abrupt slopes facing toward the north or east, in order to avoid damage from late spring frosts.[31] On this account river bluffs and lake shores are favored situations. Thus, Lake Minnetonka largely explains the density of fruit production in both Hennepin and in Carver counties, even grapes being extensively grown on its shores.

The most important of the orchard fruits is the apple, which, thanks to the work of Peter M. Gideon, originator of the "Wealthy" apple, and other horticulturists, can now be grown even in the northern section provided the soil be at once heavy and well-drained; the plum, which will do well on lighter soils; and the cherry, found mostly in the southeast, notably in Winona County.[32] Nuts were produced to a very limited extent, 7,036 of the 8,110 trees reported being black walnuts. The bulk of the bearing orchard trees in 1910 were in the southern third of the State, though this is probably due more largely to market than to climatic considerations (Fig. 183). Experience has shown that the average farmer, especially in sections remote from large cities, can not profitably grow fruit except for his own use. The production of fruit for the market is an exacting business requiring special knowledge and undivided attention to insure success.[32]

Distribution of stock raising according to the census of 1910

The distribution of horses in 1910 bore a close relation to the number of farms and the amount of improved land, the number being greatest south of the Minnesota River (Fig. 184). Another reason for this concentration was the presence of more of the younger horses in the corn- and oats-growing districts.

Beef cattle were, in general, numerous in proportion as dairy cows constituted a small per cent of the total (Fig. 185). Thus, in northeastern Minnesota dairy cows formed a considerable majority of all cattle, not because dairying was important there, but because few other cattle were kept there. Again in Ramsey, Hennepin, and closely adjacent counties, dairy cows formed an even larger majority because dairymen were ceasing to raise their own cattle, owing to the high cost of feeding them. In the southeastern section conditions varied considerably, the most intensive dairy county (Steele) showing the highest proportion of cows.[33] Finally, in the southwestern counties, as in several of the extreme southeastern, the low proportion of dairy cows shows clearly that cattle were being raised or at least fed for the market.[34]

Sheep raising was well spread throughout the State, including portions of the coniferous zone. Sheep, however, will not flourish on low or wet land, being essentially adapted to arid highlands. It was at least in part for this reason that sheep were most numerous on the relatively high and well-drained lands in the southeastern and the southwestern corners of the State (Figs. 186, 4). On such land it is estimated that one acre will carry six sheep, and that a farm of 120 to 160 acres may profitably keep 50 to 75 ewes.[35]

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[30] *Report State Dairy and Food Dept.* 1910, 129; *Fourteenth Report*, 41-42.
[31] *Eleventh Report Agr. Exp. Sta.*, 245-246; *Seventeenth Report*, 411-413; *Minnesota Horticulturist*, March, 1914, 102.
[32] *Ibid.*, 140-141.
[33] *Nineteenth Report, Agr. Exp. Sta.*, 94, 157.
[34] *Ibid.*, 94, 157, 168.

Swine were in large part a by-product of the dairy industry, being raised on skim milk and fattened on corn or barley. Corn was, however, by far the leading feed stuff, as shown by the general correspondence between the distribution of swine and of corn (Figs. 187, 173). The influence of the city milk trade was also obvious in the small number of swine reported by the city counties and others, such as Dakota and Goodhue,[36] which ship considerable quantities of milk.

Distribution of the dairy industry in 1910

Dairy cattle were distributed in about the same ratio as cultivated hay, being numerous throughout the agricultural zone, including the western and southern parts of the coniferous region especially between the Twin Cities and Duluth (Figs. 179, 188). There were, however, two areas having a greater number to the square mile than any other: one including Freeborn and adjacent counties to the north, as far as Rice; the other comprising some five or six counties west and southwest of the Twin Cities. Dairying was also the leading branch of farming in the southeastern counties, though less intensively developed than in the two areas just named; and it had made great progress even in the Red River Valley, especially in the older southern counties.

In the vicinity of cities, even those of comparatively small size, a very appreciable part of the milk and cream was consumed directly, either in the natural state or in the form of ice cream. In addition, large factories (centralizers) located in the cities, especially Minneapolis and St. Paul, manufacture butter or cheese from milk and cream received by rail. Thus investigations made in the Seminar on Economic Development at the University show that the milk supply of Minneapolis consisted, during the calendar year 1912, of 5,243,430 gallons, of which 2,529,105 gallons were hauled in by wagon and 2,714,325 gallons came by steam and electric roads. Shipments were received from points as far south as Steele, as far north as Kanabec, and as far west as Renville County, the most distant shipping point being in the latter county 105 miles from the city. The great bulk of the supply, however, came from the territory within a radius of 70 miles, the larger part of it from the counties toward the south.[37] It follows that neither the number of factories nor the output of butter and cheese tells the whole story as to dairy development, especially in counties near the three large cities, such as Goodhue, Dakota, Rice, McLeod, Carver, Anoka, Chisago, and Washington.[38] On the other hand, the output of butter and cheese in counties containing centralizers may be greater than could be made from their local supply of milk.

Allowing for this diversion of milk to direct consumption and for the effect of centralizers, the distribution of creameries and cheese factories indicates fairly well the status and localization both of dairy development and of butter and cheese manufacture (Fig. 189). Thus, in 1909, as reported by the State Dairy and Food Department, there were 797 creameries, besides 46 skim stations and 69 cheese factories. Of the creameries no less than 547 were organized on the coöperative plan, while 222 were operated for the profit of the proprietors and 28 were not clearly classified as to organization.[39] The coöperative type prevailed, though not exclusively, throughout the southeast and also the northwest; while the private creamery predominated not only in the Twin Cities, but also in several neighboring counties, notably Carver. In the southwestern corner of the State where dairying was as yet a subordinate industry, private creameries also prevailed.

The manufacture of cheese was more closely localized in 1910 than in previous years, the principal cheese district, especially for Swiss, brick, and other sweet-curd varieties, being in Dodge and Goodhue counties. Another district included Otter Tail and Wadena counties, while a third was found in Red Lake and Polk counties. The 69 cheese factories reported in 1911 were classified as follows:[40]

TABLE 21—CHEESE FACTORIES IN MINNESOTA IN 1911[40]

Organization	Number	Product	Pounds
Coöperative	32	American (Cheddar)	3,116,540
Individual	33	Brick	709,238
Centralizers	4	Swiss (three factories)	64,870
Total	69	Total	3,890,648

To avoid confusion it should be noted that there is no connection between the form of organization and the kind of cheese manufactured.

According to experience elsewhere, both in Europe and in this country, a cool summer means a better grade of milk; and the quality of milk affects the grade of cheese more than of butter. As a result, famous cheese districts are with few exceptions found at higher latitudes or altitudes than the butter districts.[41] The best environment for cheese-making is afforded by a hilly district, with rich grass, abundant cold springs, cool nights even in midsummer, and no crop demanding protracted attention during the growing season. For this reason corn, which requires long-continued cultivation, goes better with butter than with cheese-making, since butter can be made in winter, the skim milk being reserved for feeding purposes, while cheese is produced more profitably in summer, when milk is more abundant and is not needed for young animals on the farm. Moreover, where

[35] Brown, C. E., in *Proceedings Minnesota Agricultural Society*, 1911, 296-298.

[36] *Bul. 63, State Dairy and Food Dept.*

[37] Jones, C. M., *Sources of the Milk Supply of Minneapolis* (*Bul. 53, State Dairy and Food Dept.*).

[38] *Report State Dairy and Food Dept.*, 1903, 13.

[39] As given in county tables, 54-79 of *Thirteenth Report, State Dairy and Food Department*. The summary on p. 82 of the same report apparently includes nine stock companies and eight of the nineteen unspecified as "coöperative," making 574 so described.

[40] *Fourteenth Report State Dairy and Food Dept.*, 39.

[41] *Bul. 60* and *140*, *Wis. Agr. Exp. Sta.*

corn is a profitable crop it often pays better to save all the skim milk for raising hogs to be fattened on corn. This fact tends still further to localize butter-making in the corn belt and points to more elevated and more northern districts as preëminently suited to cheese-making. For all these reasons it would seem that while the Dodge and Goodhue district will doubtless persist, having the benefit of acquired experience and reputation, its development is being limited both by the competition of butter plus hogs and by the city milk trade. On the other hand, the more northern section of the state is admirably fitted for cheese-making; especially as a cheese factory will pay even where cows are too few in number to support a creamery. In fact, it would be difficult to name a more favorable environment for cheese-making than is found on the Leaf Hills Moraine in Otter Tail County, and other rugged morainic tracts in northern Minnesota.

It is indeed claimed that the residual limestone soils in Wisconsin give the highest quality of milk; and that a fairly moist atmosphere is advantageous in the curing of cheese. The marketing of cheese is also a complex process, in which the refrigeration facilities of the great meat-packing plants at Chicago play a considerable role.[42] In all these respects Wisconsin would seem to have a certain advantage over Minnesota. However, both the area of gray drift and the older drift in the Leaf Hills region are rich in limestone; atmospheric moisture can be regulated artificially during curing, if necessary, as is done in cotton mills; and the marketing advantage of Wisconsin may be offset by cheaper feed stuffs, due to the greater proximity of grain fields and milling centers. An organized effort might also result in satisfactory icing arrangements with the meat packers at South St. Paul, Austin, and elsewhere, similar to those in effect at Chicago.

Distribution of poultry and bee industries according to the census of 1910

Poultry raising in 1909 was widely distributed in Minnesota, as in the country at large, being a side industry often carried on by the women: though only a few of the leading crops gave larger returns (Table 24, Fig. 190). In general, poultry raising is favored by a sandy, or at least well-drained, soil and a location near large urban centers.[43] Accordingly, an area of greater density of poultry-raising appeared west and southwest from Minneapolis, in the district previously noted as the seat of intensive agriculture. Coöperative marketing of eggs has been undertaken in some localities, occasionally in connection with dairy establishments.[44]

The bee industry, on the other hand, showed a distinct localization within the original forest zones, especially the hardwood belt, probably because of better shelter (Figs. 191, 8). The relation of bees to fruit was also fairly obvious; while counties which largely adhered to grain farming had made little progress in bee keeping.

Distribution of value of farm products in 1910

The value of farm products was distributed with remarkable regularity over the southern third of the State, aside from the district east of the Mississippi; though an area of greater density could be distinguished in Ramsey, Hennepin, and several counties farther west. This density was evidently due to the intensive use of certain land areas to supply the city markets with perishable products, as well as the introduction of canning and sugar factories. Toward the northwest there was clearly apparent the effect of rugged moraines and of the White Earth Indian reservation in reducing productivity. The most striking features of all, however, were (1) the slight development of agriculture, measured by value of products, in the coniferous region; and (2) the enormous increase in value of products in the State as a whole (Figs. 192, 218).

Distribution of value of farms in 1910

During the decade ending 1910 the value of farm land increased in every county for which comparison was possible (Fig. 193). The figures shown on the map are averages for the whole counties, and of course are much less than the increase in certain townships. Aside from the suburban counties the greatest advance occurred in the three southwestern counties, decreasing (though not regularly) toward the north and east. These changes consequently tended to increase rather than to equalize differences in land values, the lands already relatively high priced showing the greatest advances.

The average land value in 1910 exclusive of buildings varied from $111.47 in Ramsey and $80.56 in Hennepin to $9.63 in Cook, the average per acre for the State being $36.82. Aside from the suburban counties, the highest level of value was in the southwestern and south central counties, sinking irregularly toward the north and east. In general, the value of farm land corresponded to the relative value of farm products in the several sections of the State (Figs. 194, 192).

Distribution of population in 1910

In 1910, as in 1900, an area of greater density appeared around and west of the Twin Cities, including towns of 2,500 or less inhabitants. If, however, all incorporated places be excluded (Figs. 195, 196), the even spread previously noted becomes even more striking. This relative equality appeared not only west of the Mississippi but also in the potato belt east of that river. Only the coniferous section to the northeast remained largely unoccupied by an agricultural population. There was, indeed, a considerable sprinkling of population there outside the incorporated villages but the settlers mostly found employment in other occupations, chiefly lumbering or mining, as appears from the statistics of improved land and of farm products.

The same phenomenon of a decrease in the country population first encountered in 1890, and again in 1900, reappeared in 1910 on a greatly enlarged scale. In fact, a considerable number of counties, mostly in the southern part of the State, decreased, in total population (Fig. 197); a still larger number, extending in an almost continuous zone from southeast to northwest, declined in total rural population, which includes both country and town population up to the 2,500 size; and with the exception of two in the extreme northwest, and five scattered counties, mostly in the southwest, there was a loss of country population throughout the entire agricultural zone west of the Mississippi (Figs. 197, 198). Even east of the Mississippi several of the older counties lost country population. Only in the region of cut-over lands was there any considerable increase on the percentage basis; and the actual increase even there was not large, except for the iron ranges, where the country population is non-agricultural. Minnesota thus exhibits the same condition of decreasing farm population which had previously appeared in some of the older agricultural states farther east and south. (See map, abstract of the Thirteenth Census, page 58, showing per cent of increase in rural population by states, 1900-1910). The problem presented is therefore not at all local, but rather, associated with a certain type of agriculture and stage of economic development (pages 216-219).

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[42] *Bul. 210 and 231. Wis. Agr. Exp. Sta.*
[43] *Thirteenth Report, Agr. Exp. Sta., 240.*
[44] *Bul. 138. Agr. Exp. Sta.*

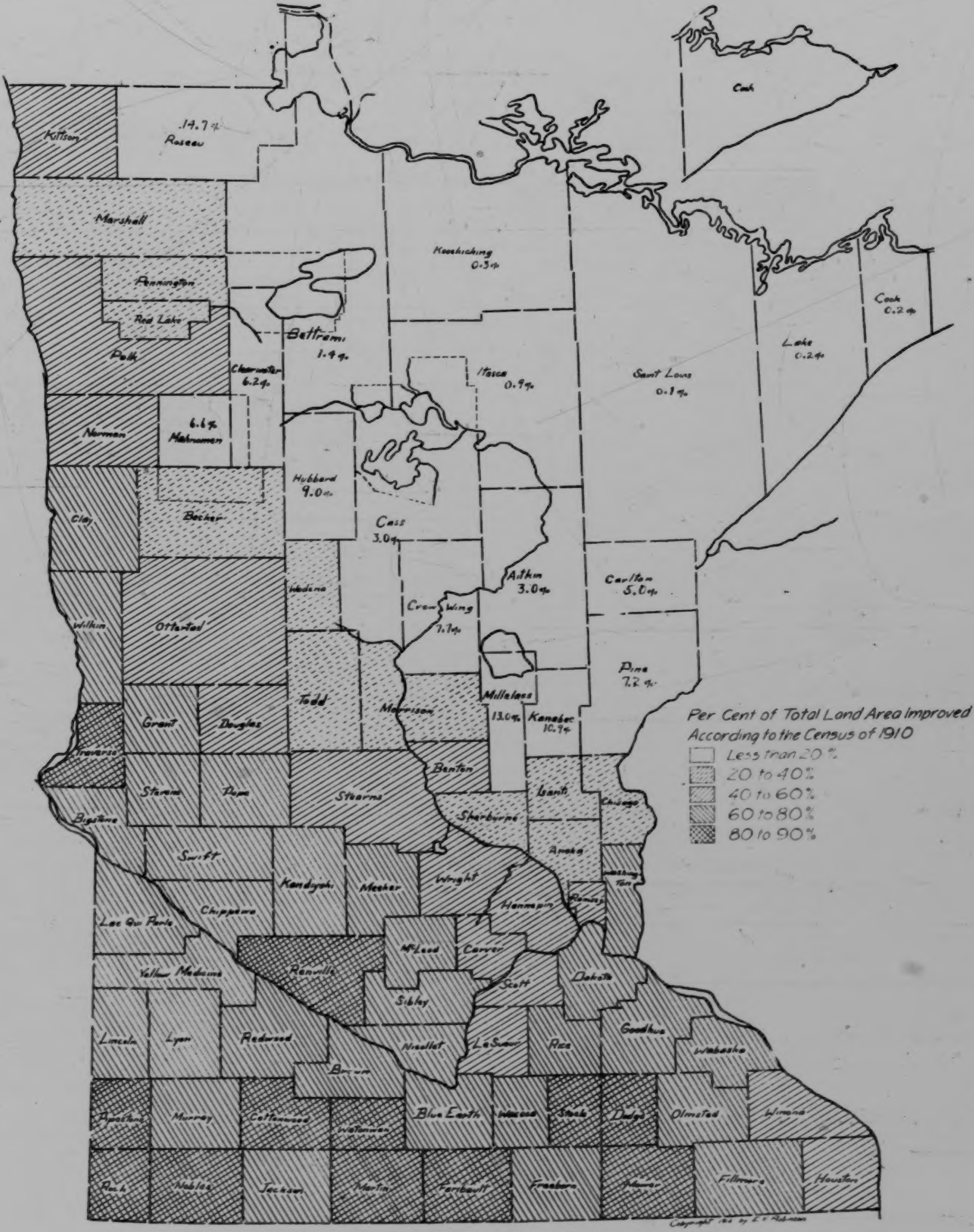
Cook
Kittson
14.7%
Roseau
Marshall
Koochiching
0.3%
Pennington
Red Lake
Beltrami
1.4%
Cook
0.2%
Lake
0.2%
Polk
Clearwater
6.2%
Itasca
0.9%
Saint Louis
0.1%
Norman
6.6%
Mahnomen
Hubbard
9.0%
Clay
Becker
Cass
3.0%
Wadena
Aitkin
3.0%
Carlton
5.0%
Wilkin
Ottertail
Crow Wing
7.1%
Pine
7.2%
Todd
Morrison
Mille Lacs
13.0%
Kanabec
10.9%
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Big Stone
Sherburne
Anoka
Swift
Kandiyohi
Meeker
Wright
Washington
Hennepin
Ramsey
Chippewa
Lac Qui Parle
McLeod
Carver
Renville
Yellow Medicine
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Per Cent of Total Land Area Improved
According to the Census of 1910
Less than 20%
20 to 40%
40 to 60%
60 to 80%
80 to 90%
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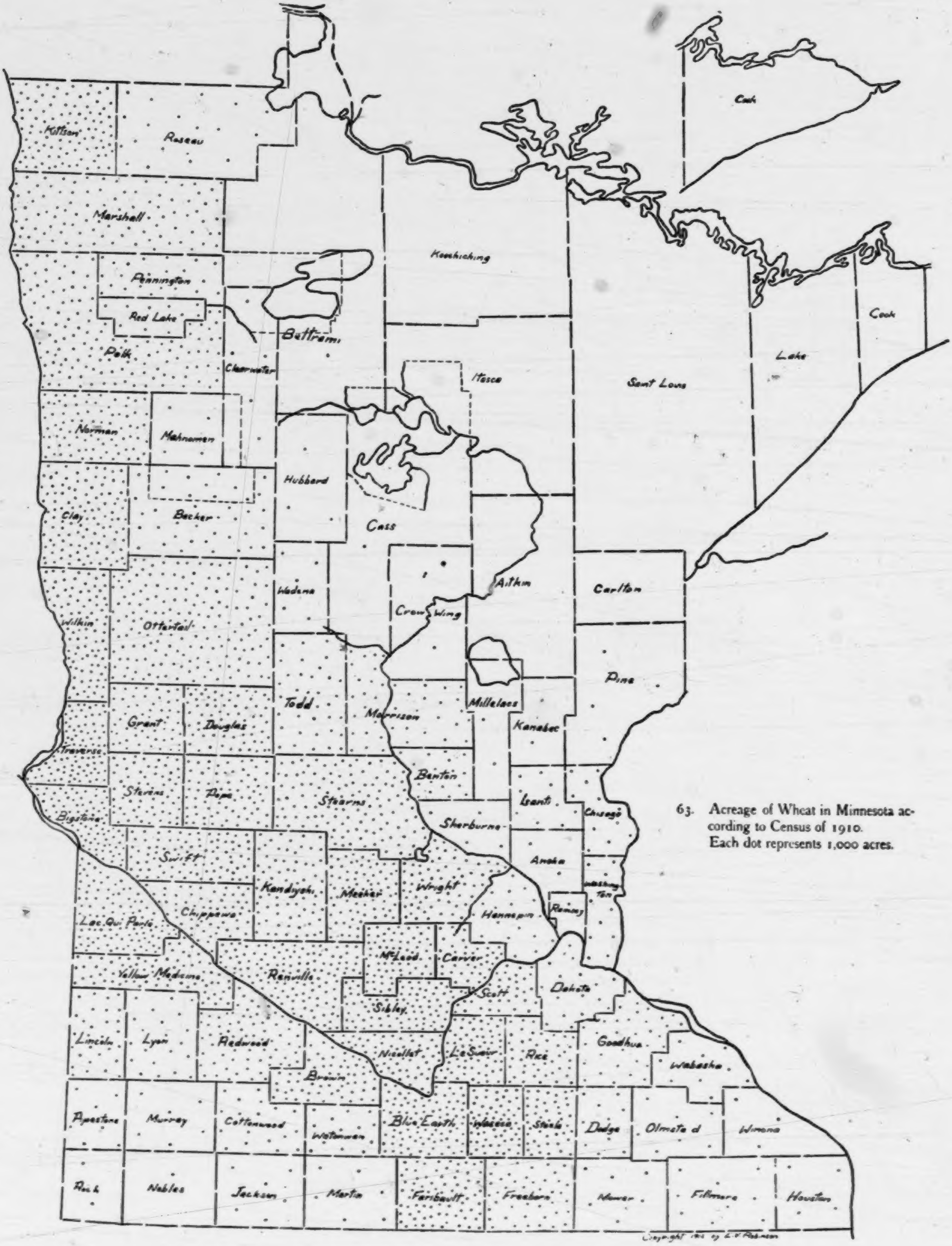
Figure 161. Distribution of improved land according to the census of 1910.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Mahnomen
Hubbard
Clay
Becker
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Crow Wing
Aitkin
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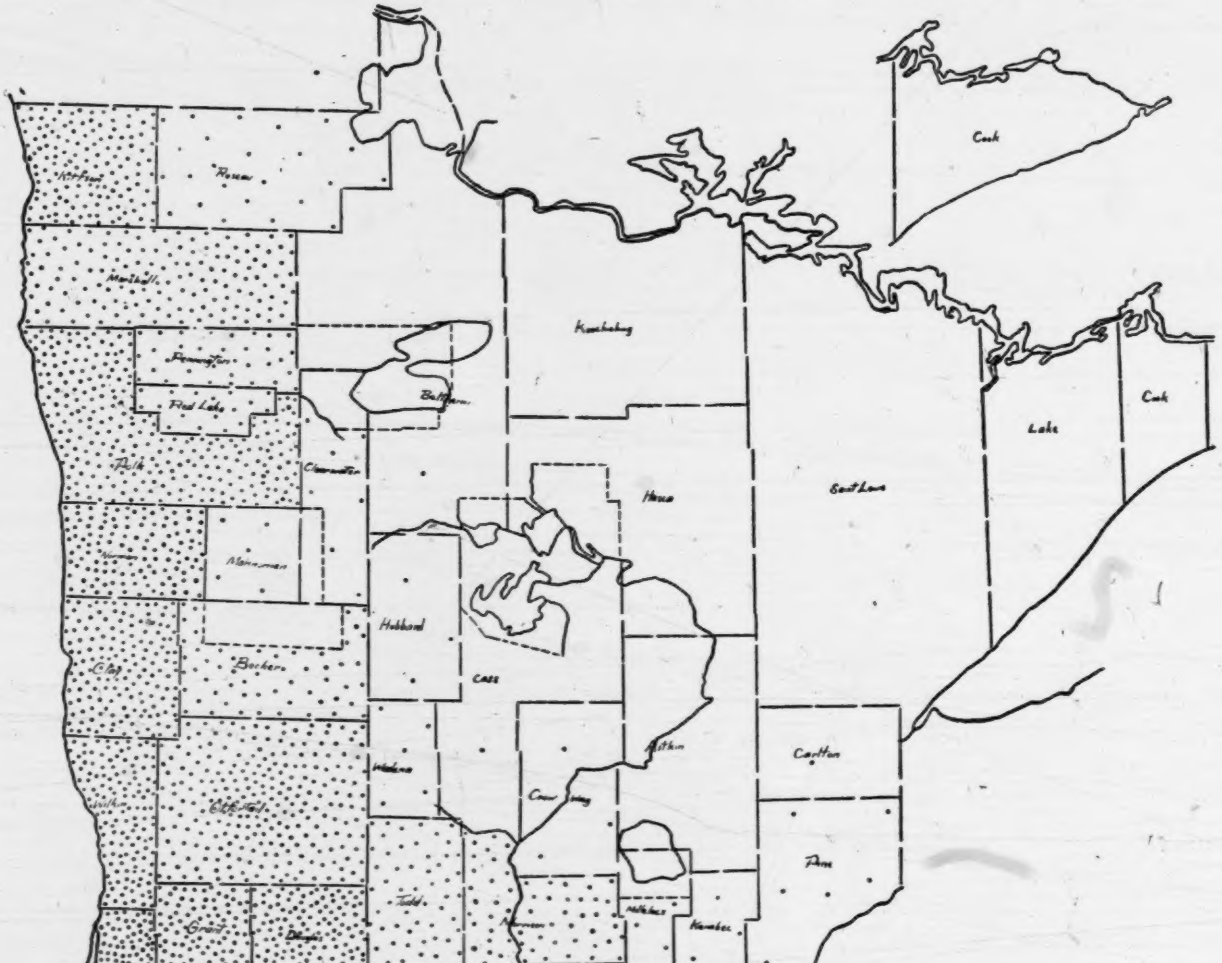
Kandiyohi
Meeker
Wright
Washington
Hennepin
Ramsey
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Copyright [illegible] by E.V. Robinson

63. Acreage of Wheat in Minnesota according to Census of 1910.
Each dot represents 1,000 acres.

Figure 162. Acreage of wheat in 1909 according to the census of 1910. (Based on Table XIII)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Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

19. Production of Wheat in Minnesota according to Census of 1910. Each dot represents 10,000 Bushels.

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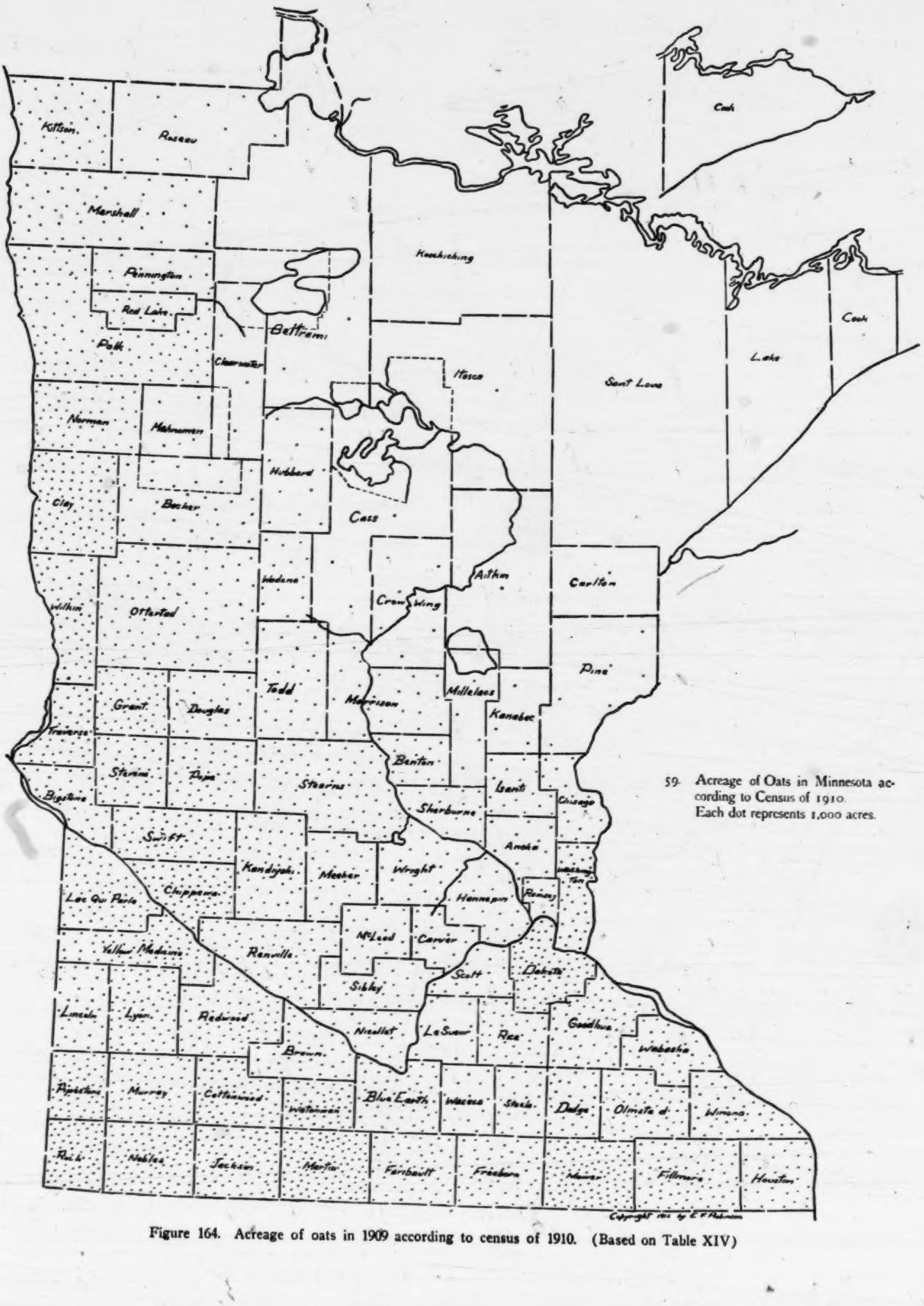
Figure 163. Production of wheat in 1909 according to census of 1910. (Based on Table XIII)


Kittson.
Roseau
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Mahnomen
Hubbard
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Becker
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Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
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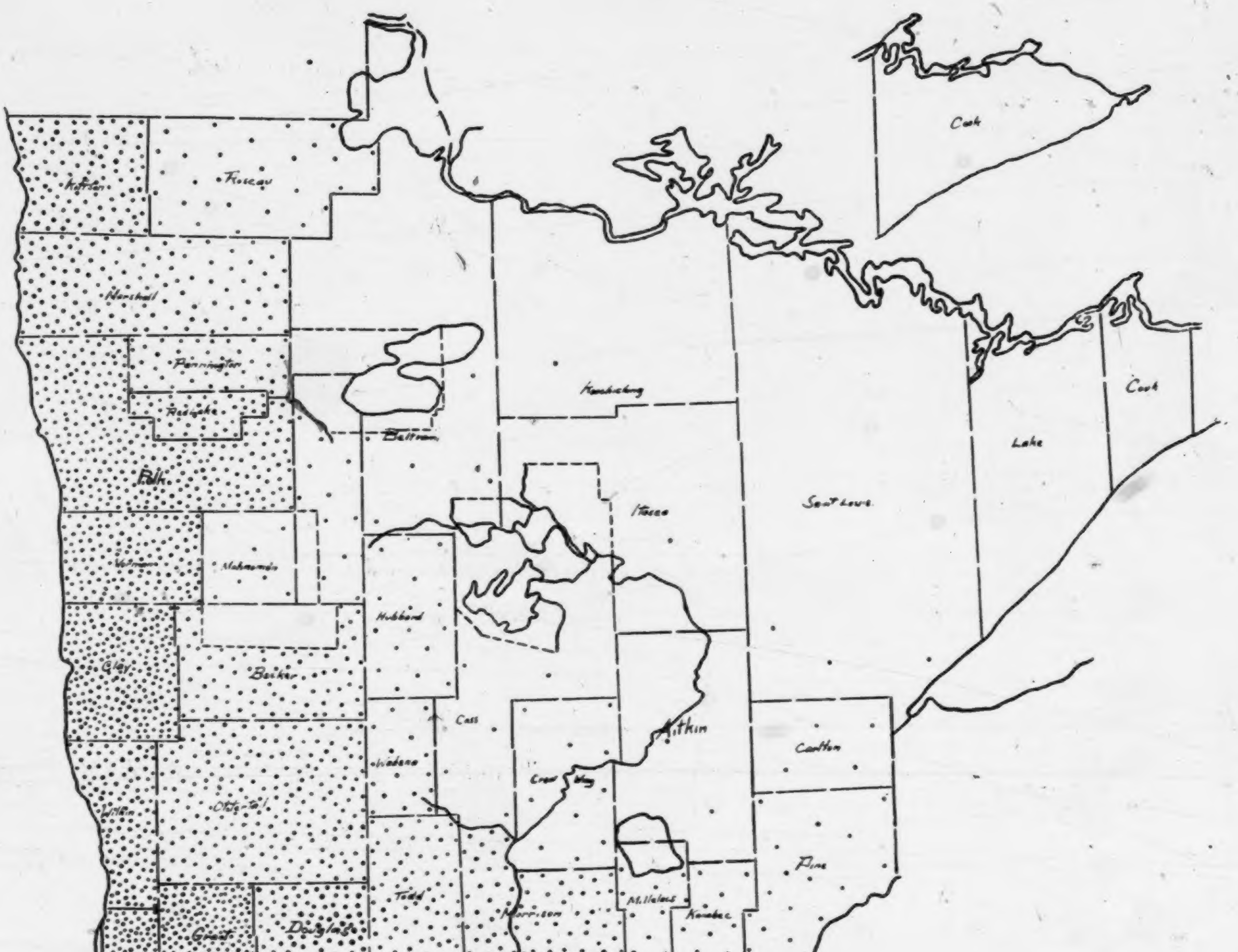
59. Acreage of Oats in Minnesota according to Census of 1910.
Each dot represents 1,000 acres.

Figure 164. Acreage of oats in 1909 according to census of 1910. (Based on Table XIV)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Scott
Dakota
Sibley
Renville
Goodhue
Nicollet
Le Sueur
Brown
Blue Earth
Waseca
Freeborn
Fillmore
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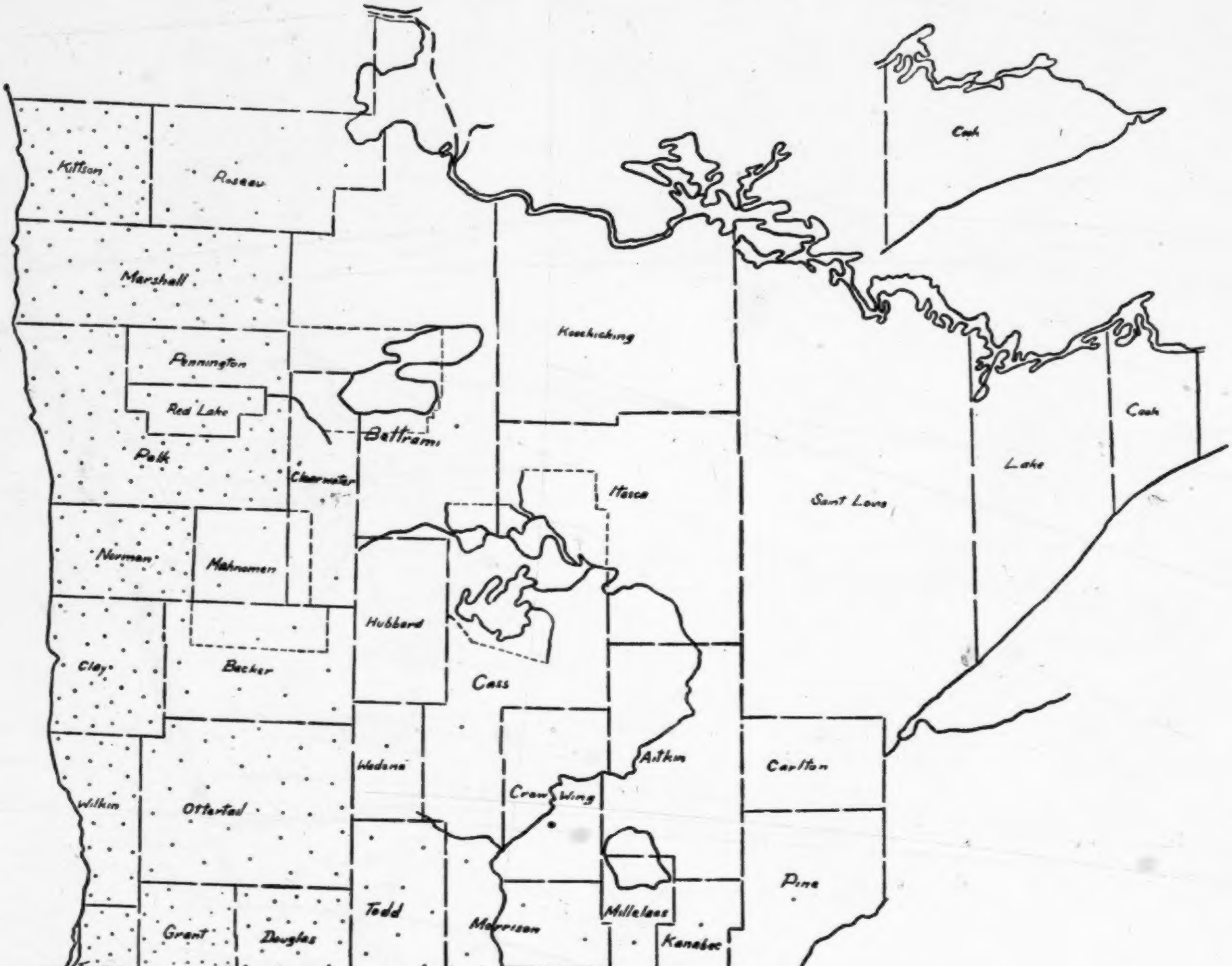
Copyright 1910, E. V. Robinson

31. Production of Oats in Minnesota according to Census of 1910.
Each dot represents 10,000 Bushels.

Figure 165. Production of oats in 1909 according to census of 1910. (Based on Table XIV)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Wilkin
Ottertail
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Crow Wing
Aitkin
Carlton
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Morrison
Millelacs
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Lac Qui Parle
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Nicollet
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Rice
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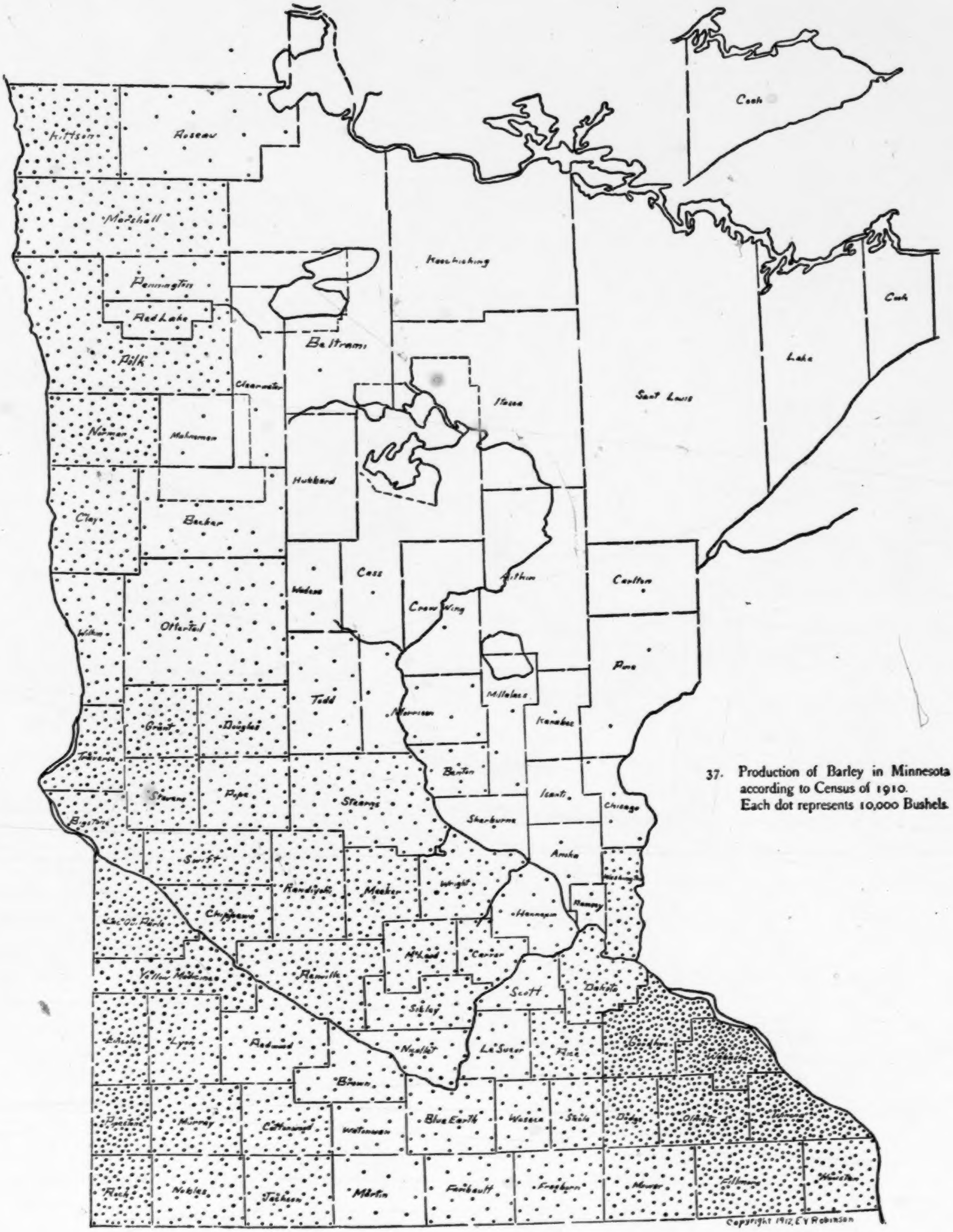
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

51. Acreage of Barley in Minnesota according to Census of 1910.
Each dot represents 1,000 acres.

Figure 166. Acreage of barley in 1909 according to census of 1910. (Based on Table XVI)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Becker
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Wadena
Crow Wing
Aitkin
Carlton
Pine
Wilkin
Ottertail
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Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chicago
Big Stone
Sherburne
Anoka
Swift
Kandiyohi
Meeker
Wright
Washington
Hennepin
Ramsey
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Goodhue
Wabasha
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Brown
Winona
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
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37. Production of Barley in Minnesota
according to Census of 1910.
Each dot represents 10,000 Bushels.

Figure 167. Production of barley in 1909 according to census of 1910. (Based on Table XVI)

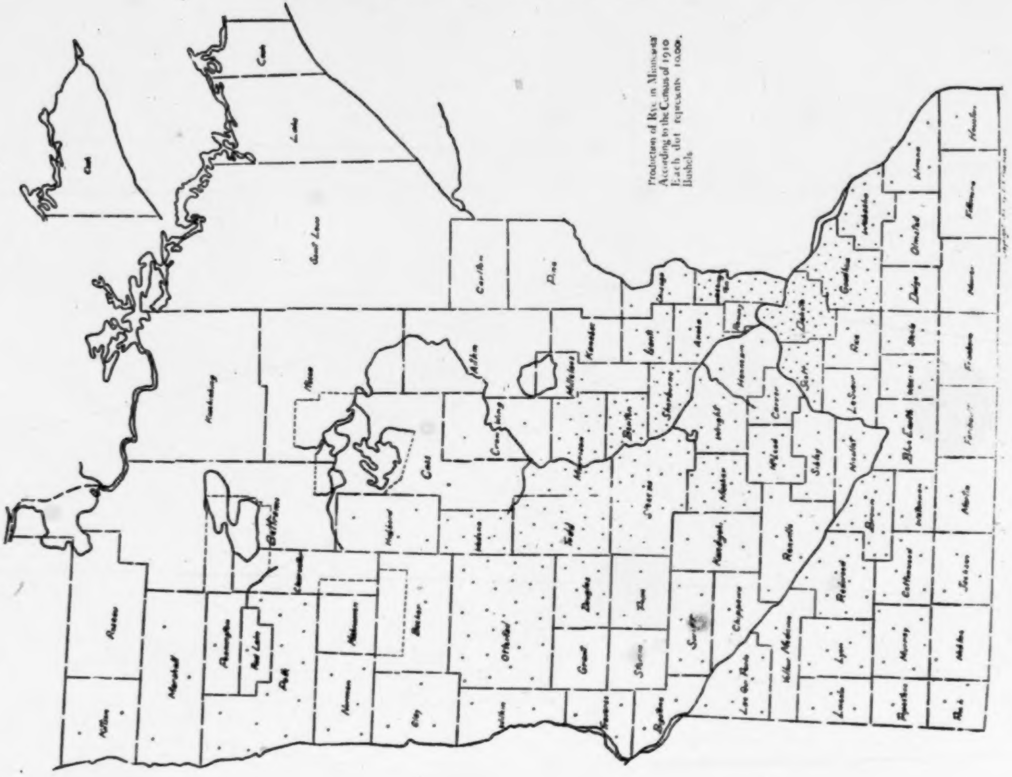

Production of Rye in Minnesota According to the Census of 1910 Each dot represents 10,000 Bushels.

Figure 169. Production of rye in 1909 according to the census of 1910. (Based on Table XVII)

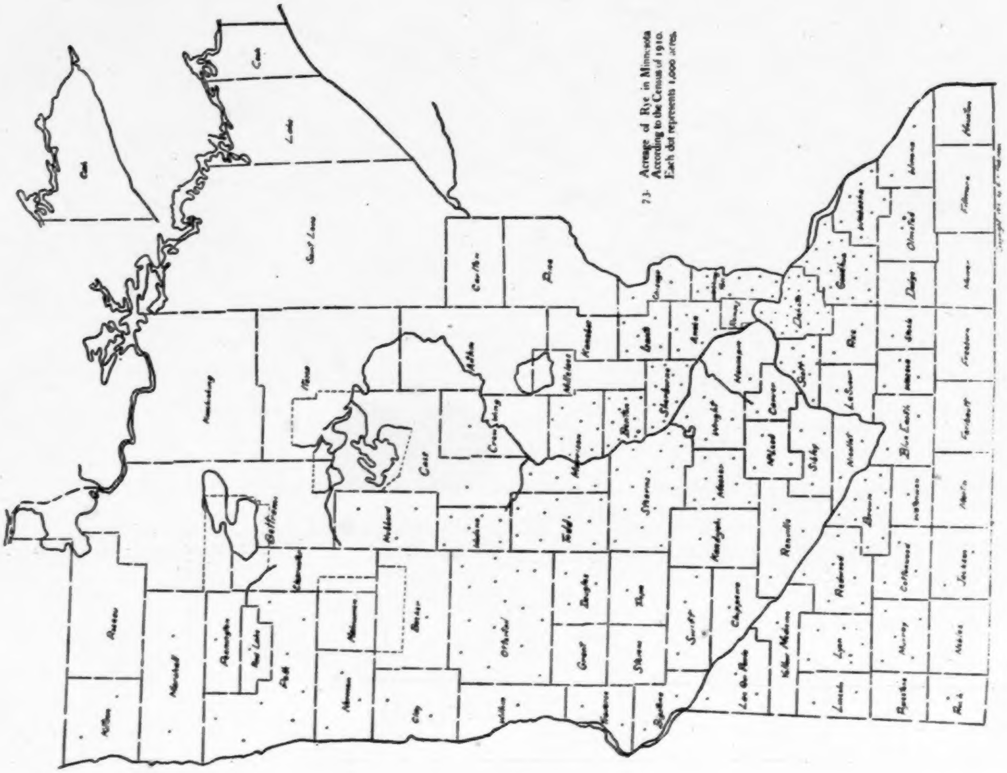

Acreage of Rye in Minnesota According to the Census of 1910. Each dot represents 1,000 acres.

Figure 168. Acreage of rye in 1909 according to census of 1910. (Based on Table XVII)

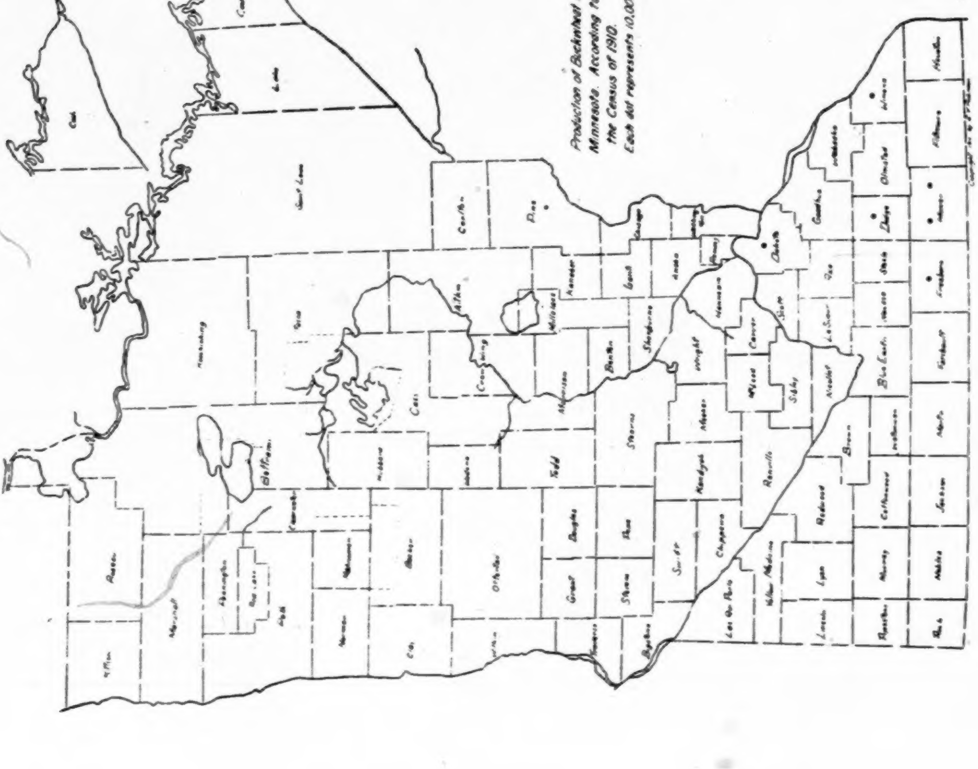

Production of Buckwheat in Minnesota. According to the Census of 1910.
Each dot represents 10,000 bushels.

Figure 170. Production of buckwheat in 1909 according to the census of 1910.

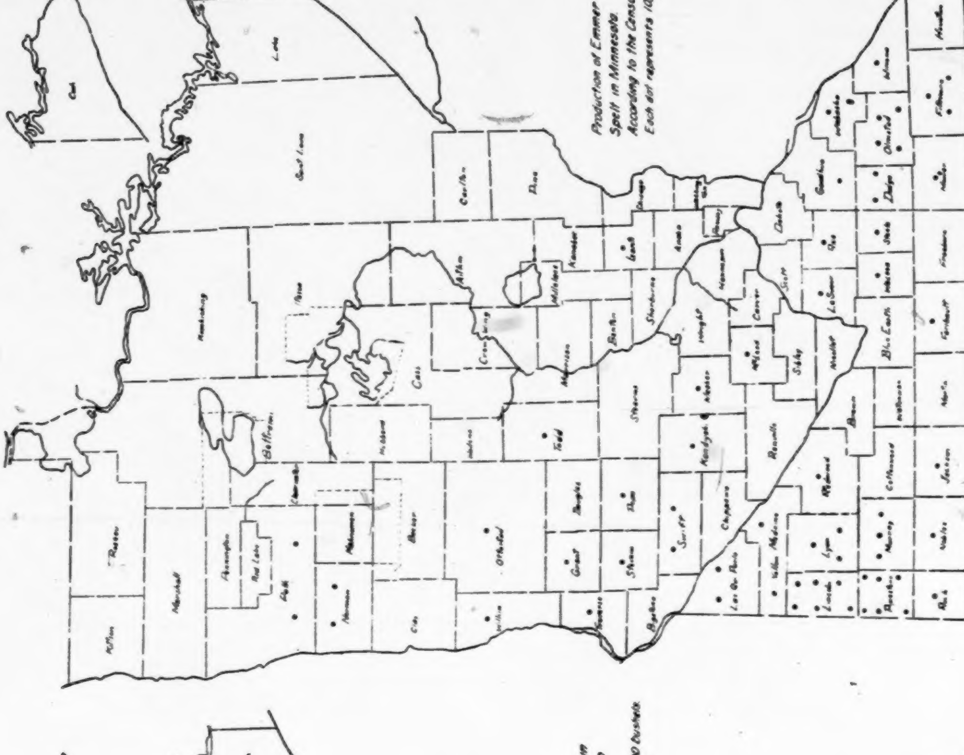
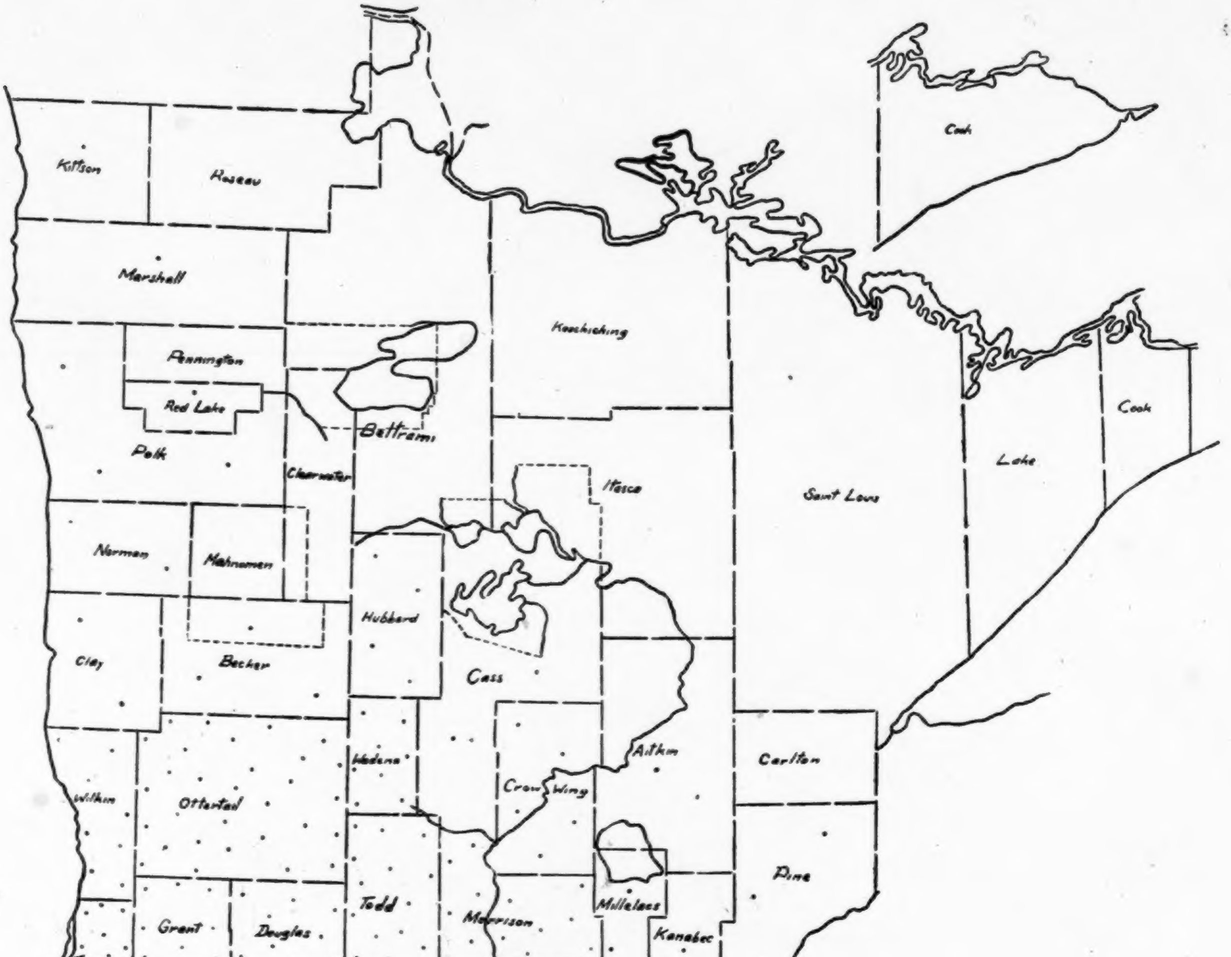

Production of Emmer and Spelt in Minnesota According to the Census of 1910
Each dot represents 10,000 bushels.

Figure 171. Production of emmer and spelt in 1909 according to the census of 1910.


Kittson
Roseau
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Marshall
Koochiching
Pennington
Red Lake
Beltrami
Cook
Polk
Clearwater
Lake
Itasca
Saint Louis
Norman
Mahnomen
Hubbard
Clay
Becker
Cass
Wadena
Aitkin
Carlton
Wilkin
Ottertail
Crow Wing
Pine
Todd
Mille Lacs
Grant
Douglas
Morrison
Kanabec
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Bigstone
Sherburne
Swift
Anoka
Kandiyohi
Meeker
Wright
Washington
Chippewa
Hennepin
Ramsey
Lac Qui Parle
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
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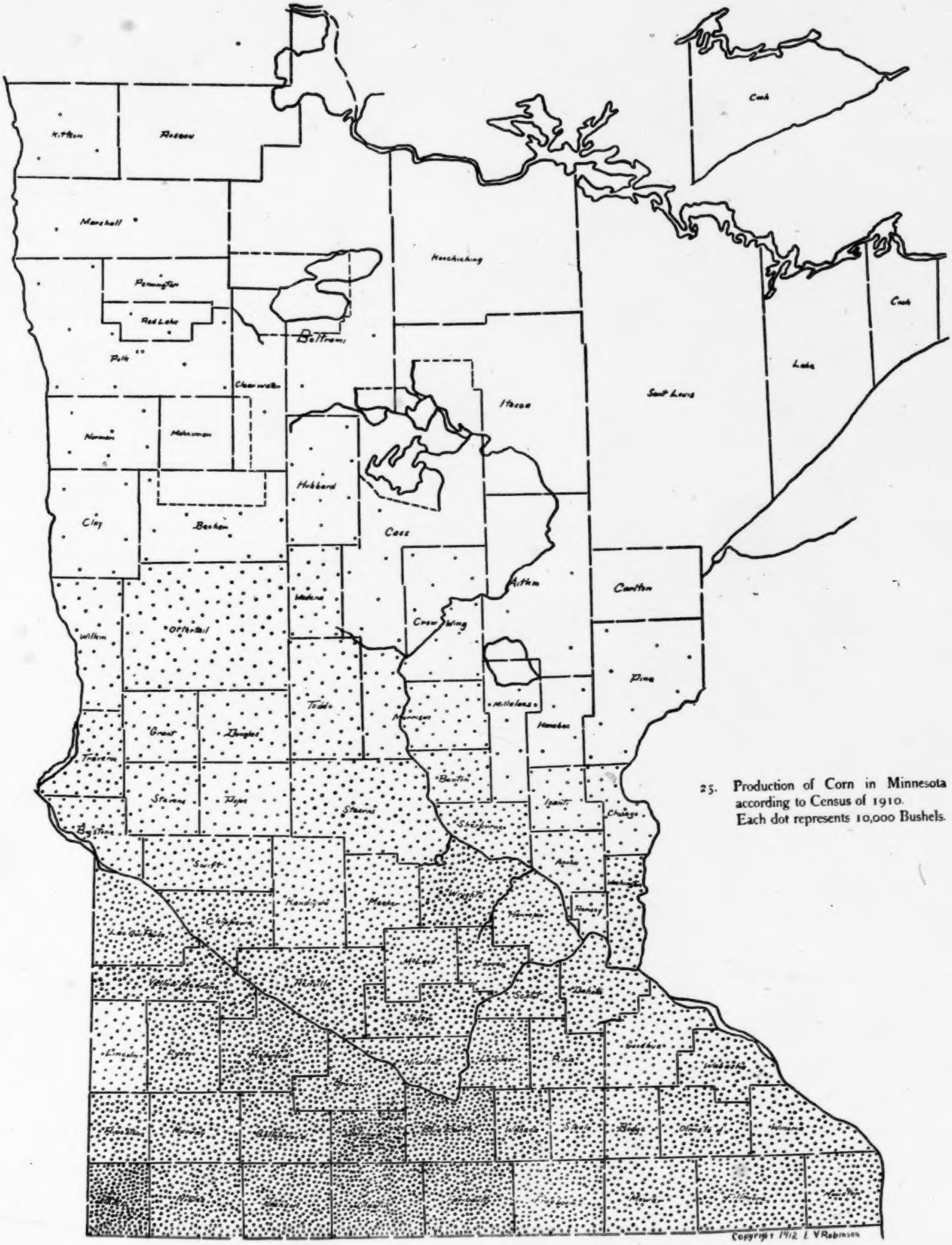
55. Acreage of Corn in Minnesota according to Census of 1910.
Each dot represents 1,000 acres.

Figure 172. Acreage of corn in 1909 according to census of 1910. **(Based on Table XV)**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Beltrami
Koochiching
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Itasca
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Becker
Hubbard
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Aitkin
Carlton
Crow Wing
Otter Tail
Wilkin
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Mille Lacs
Pine
Kanabec
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Meeker
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Hennepin
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Lac qui Parle
McLeod
Yellow Medicine
Renville
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Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Murray
Cottonwood
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Nobles
Jackson
Faribault
Freeborn
Mower
Fillmore
Houston

25. Production of Corn in Minnesota according to Census of 1910.
Each dot represents 10,000 Bushels.

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Figure 173. Production of corn in 1909 according to census of 1910. (Based on Table XV)

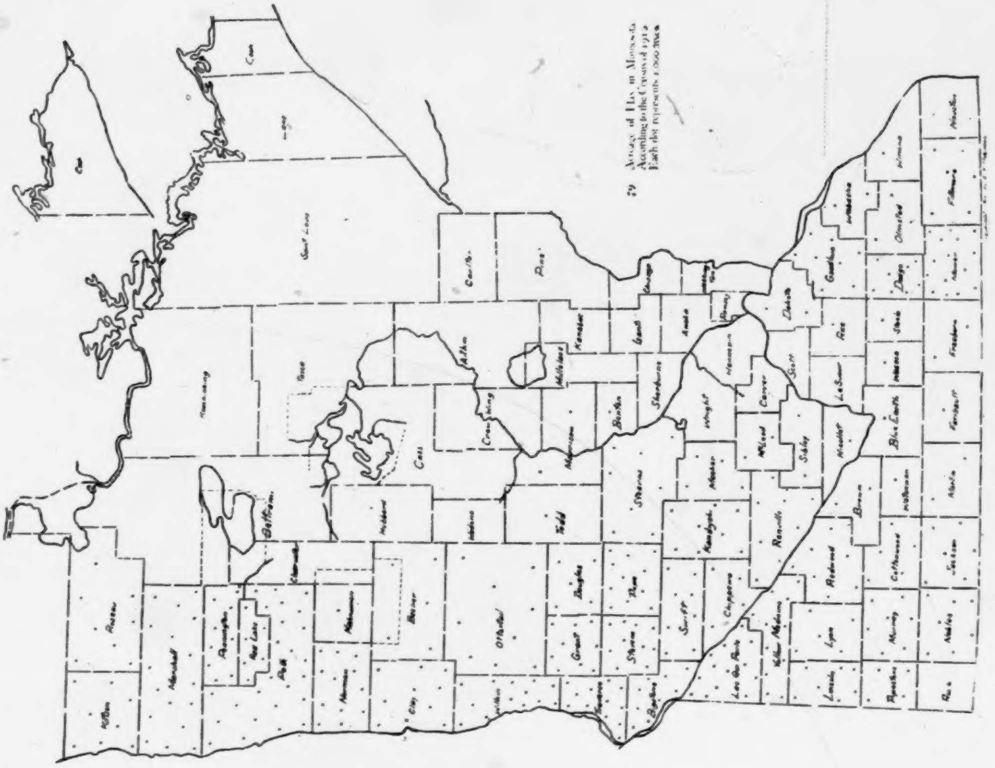

179 Acreage of Flax in Minnesota
According to the Census of 1910
Each dot represents 1,000 acres

Figure 174. Acreage of flax in 1909 according to the census of 1910. (Based on Table XIX)

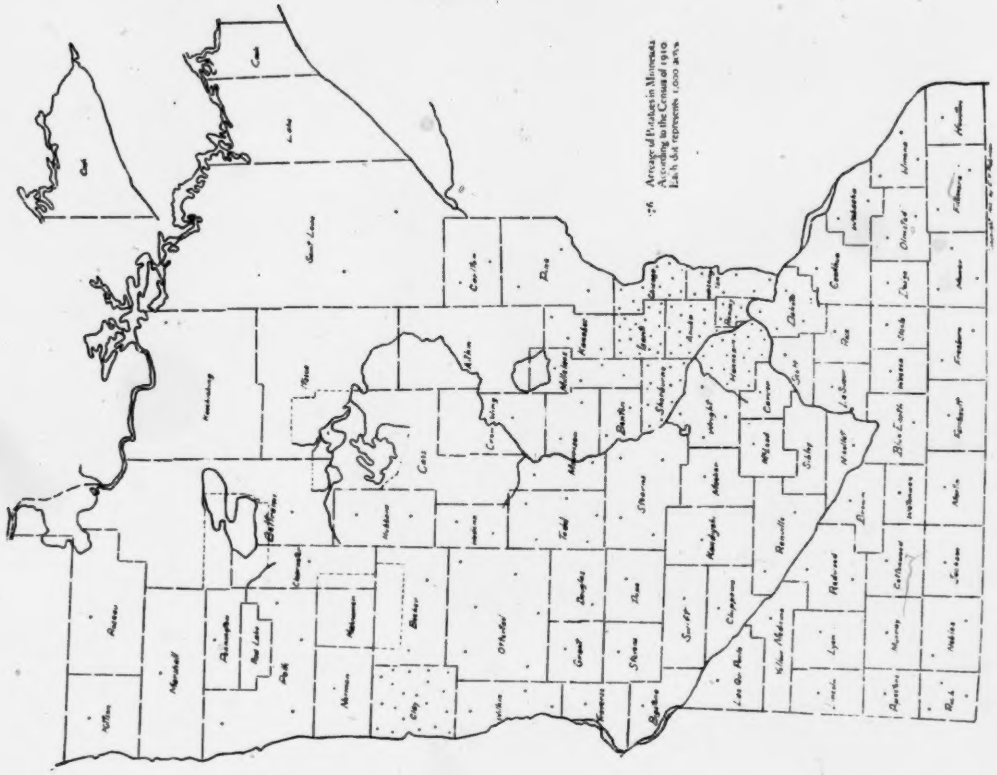
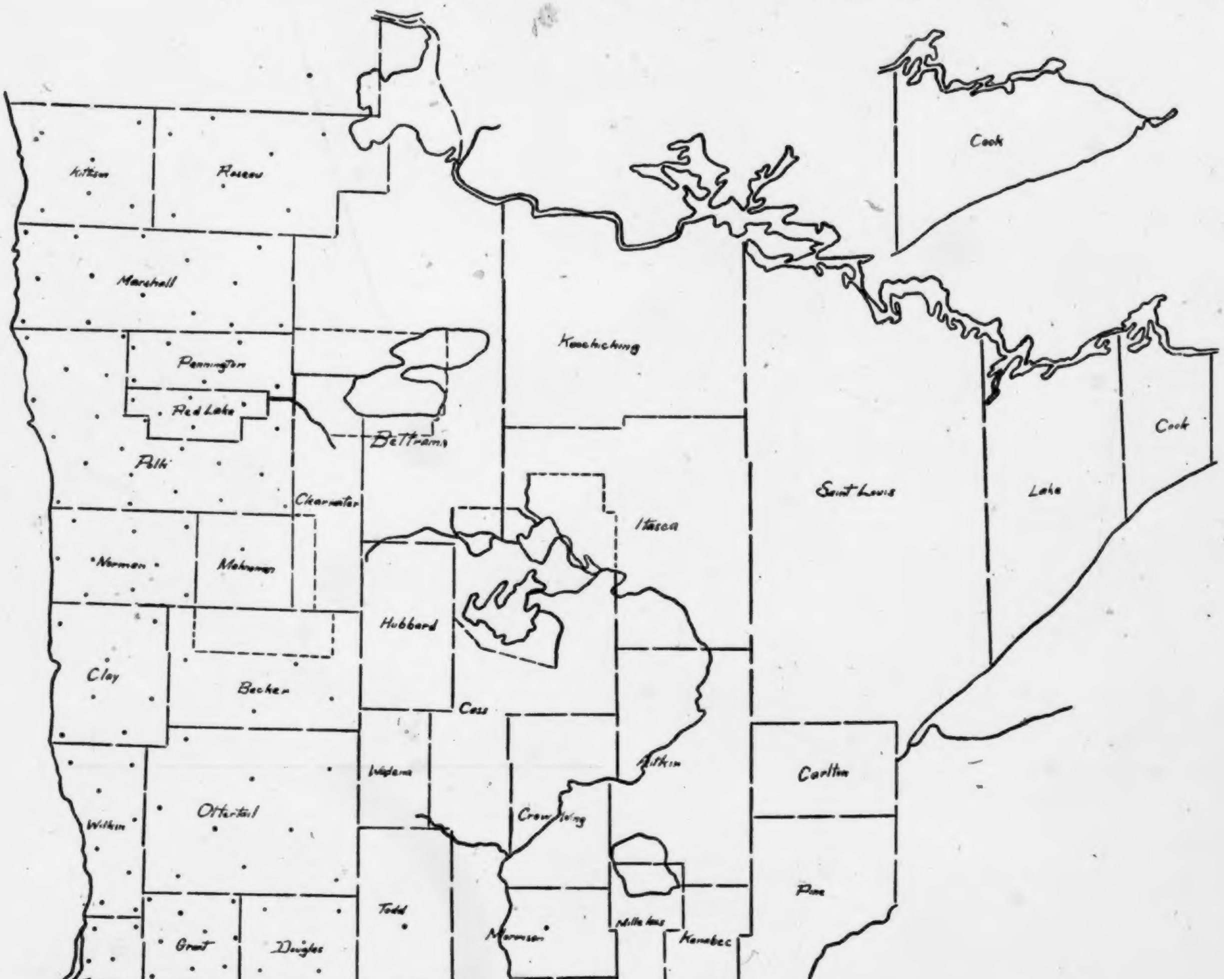

178 Acreage of Potatoes in Minnesota
According to the Census of 1910
Each dot represents 1,000 acres

Figure 175. Acreage of potatoes in 1909 according to the census of 1910. (Based on Table XVIII)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Hubbard
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Becker
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Wadena
Otter Tail
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Crow Wing
Aitkin
Carlton
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Mille Lacs
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Le Sueur
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Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
47. Production of Flaxseed in Minnesota according to Census of 1910. Each dot represents 10,000 Bushels.
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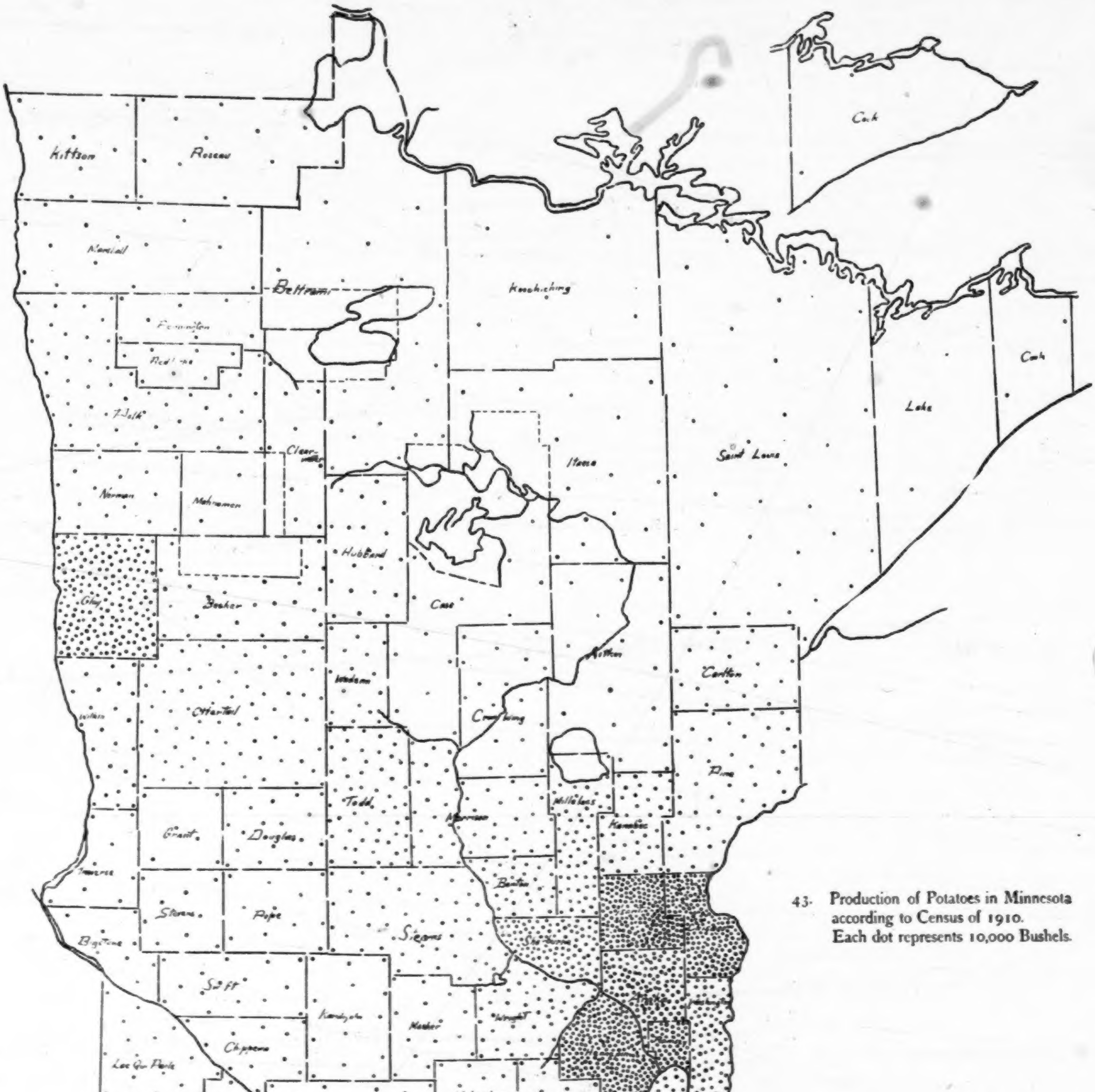
Figure 176. Production of flaxseed in 1909 according to the census of 1910. (Based on Table XIX)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Clearwater
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Hubbard
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Becker
Wadena
Aitkin
Carlton
Wilkin
Otter Tail
Crow Wing
Pine
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Benton
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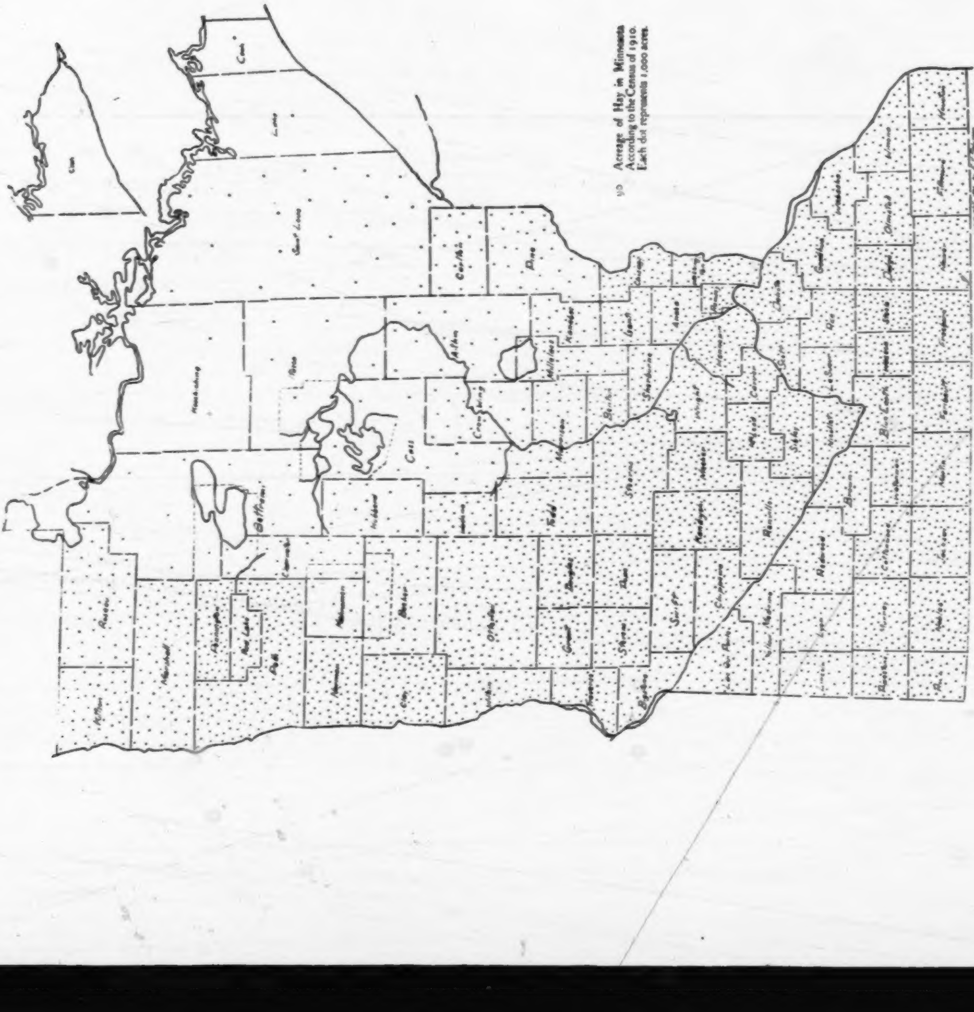
Pope
Stearns
Sherburne
Big Stone
Swift
Kandiyohi
Meeker
Wright
Chippewa
Lac Qui Parle
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Goodhue
Nicollet
Le Sueur
Rice
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
Copyright 1912 E V Robinson

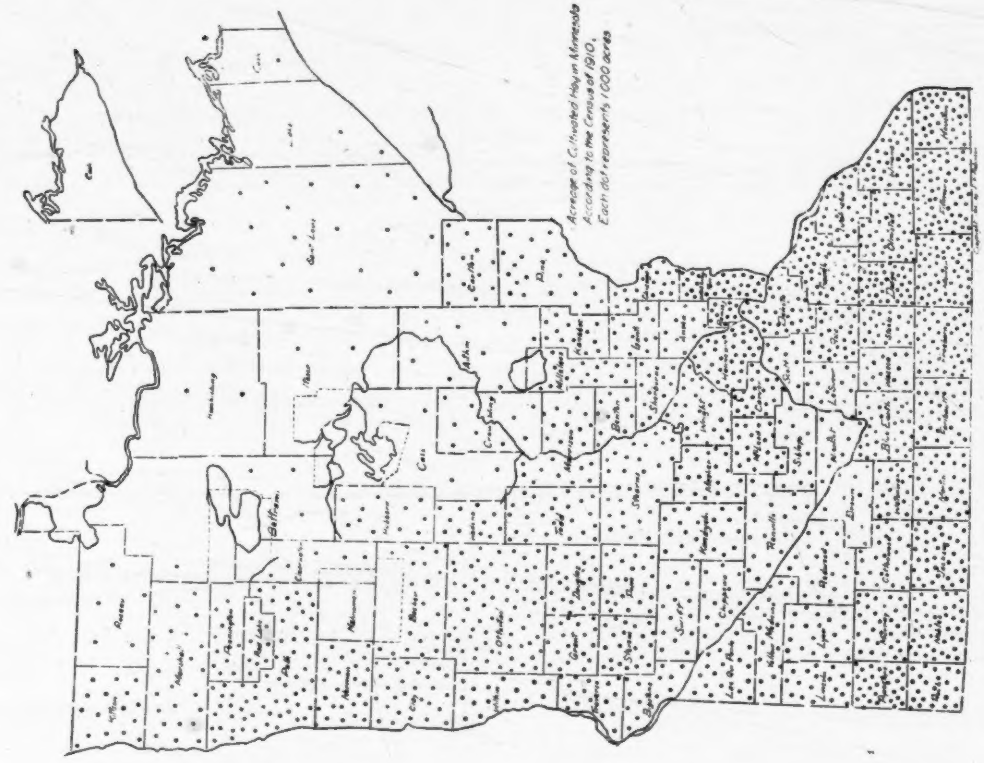
43. Production of Potatoes in Minnesota according to Census of 1910.
Each dot represents 10,000 Bushels.

Figure 177. Production of potatoes in 1909 according to census of 1910. (Based on Table XVIII)



Acreage of Hay in Minnesota According to the Census of 1910. Each dot represents 1,000 acres.

Figure 178. Acreage of wild and cultivated hay in 1909 according to the census of 1910.



Acreage of Cultivated Hay in Minnesota According to the Census of 1910. Each dot represents 1,000 acres

Figure 179. Acreage of cultivated hay in 1909 according to the census of 1910.

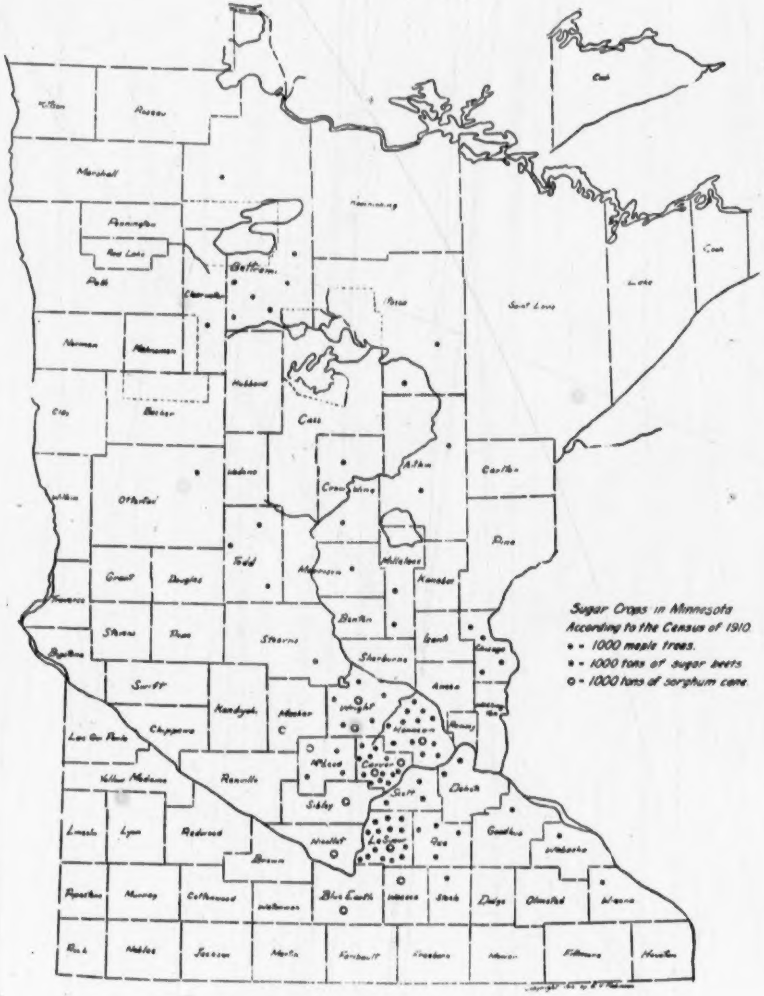

Sugar Crops in Minnesota
According to the Census of 1910
• - 1000 maple trees.
▪ - 1000 tons of sugar beets
○ - 1000 tons of sorghum cane
Kittson
Roseau
Marshall
Pennington
Red Lake
Polk
Beltrami
Clearwater
Norman
Mahnomen
Clay
Becker
Hubbard
Cass
Koochiching
Itasca
Saint Louis
Lake
Cook
Carlton
Aitkin
Crow Wing
Wadena
Otter Tail
Wilkin
Grant
Douglas
Todd
Morrison
Mille Lacs
Kanabec
Pine
Traverse
Stevens
Pope
Stearns
Benton
Isanti
Chisago
Big Stone
Swift
Kandiyohi
Meeker
Wright
Sherburne
Anoka
Hennepin
Ramsey
Washington
Lac Qui Parle
Chippewa
Renville
McLeod
Carver
Scott
Dakota
Yellow Medicine
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

Figure 180. Sugar crops in 1909 according to the census of 1910. (Distribution of sugar beets based on Table XX)

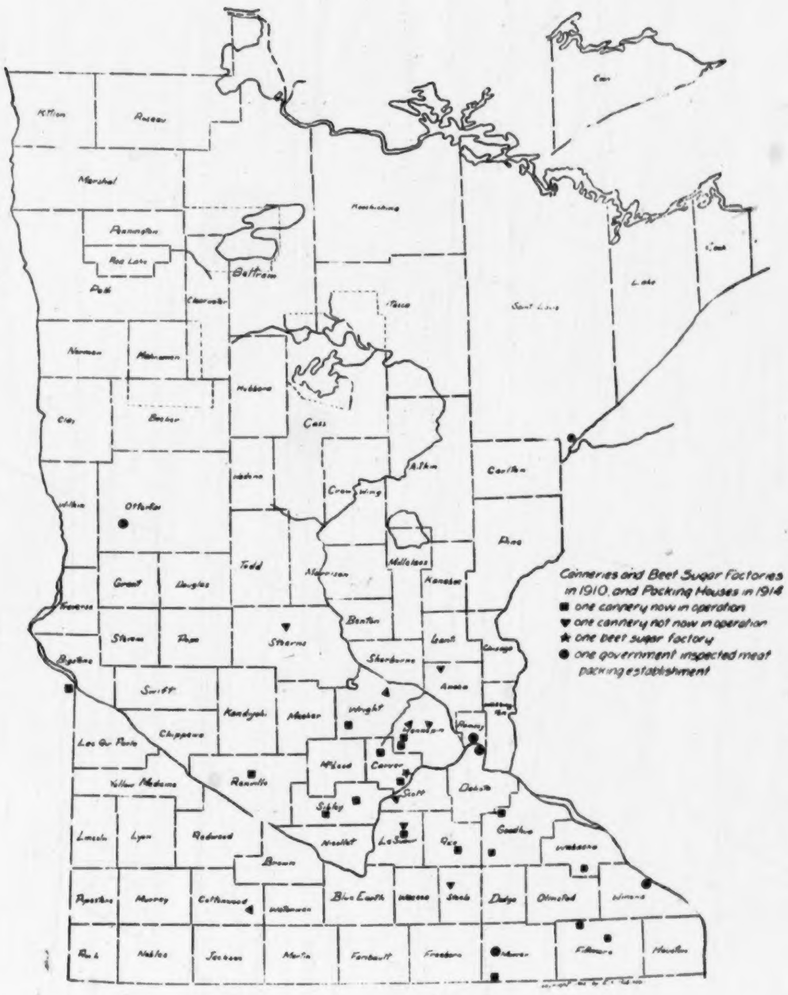

Canneries and Beet Sugar Factories in 1910, and Packing Houses in 1914
■ one cannery now in operation
▼ one cannery not now in operation
★ one beet sugar factory
● one government inspected meat packing establishment
Kittson
Roseau
Marshall
Pennington
Red Lake
Polk
Beltrami
Clearwater
Norman
Mahnomen
Clay
Becker
Hubbard
Cass
Koochiching
Itasca
Saint Louis
Lake
Cook
Carlton
Aitkin
Crow Wing
Wadena
Otter Tail
Wilkin
Grant
Douglas
Todd
Morrison
Mille Lacs
Kanabec
Pine
Traverse
Stevens
Pope
Stearns
Benton
Isanti
Chisago
Big Stone
Swift
Kandiyohi
Meeker
Wright
Sherburne
Anoka
Hennepin
Ramsey
Lac Qui Parle
Chippewa
Renville
McLeod
Carver
Scott
Dakota
Yellow Medicine
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

Figure 181. Location of canneries, meat-packing establishments, and beet-sugar plants.[46]

[46] *Report of State Dairy and Food Commissioner*, 1910, 129; and Thirteenth Census.

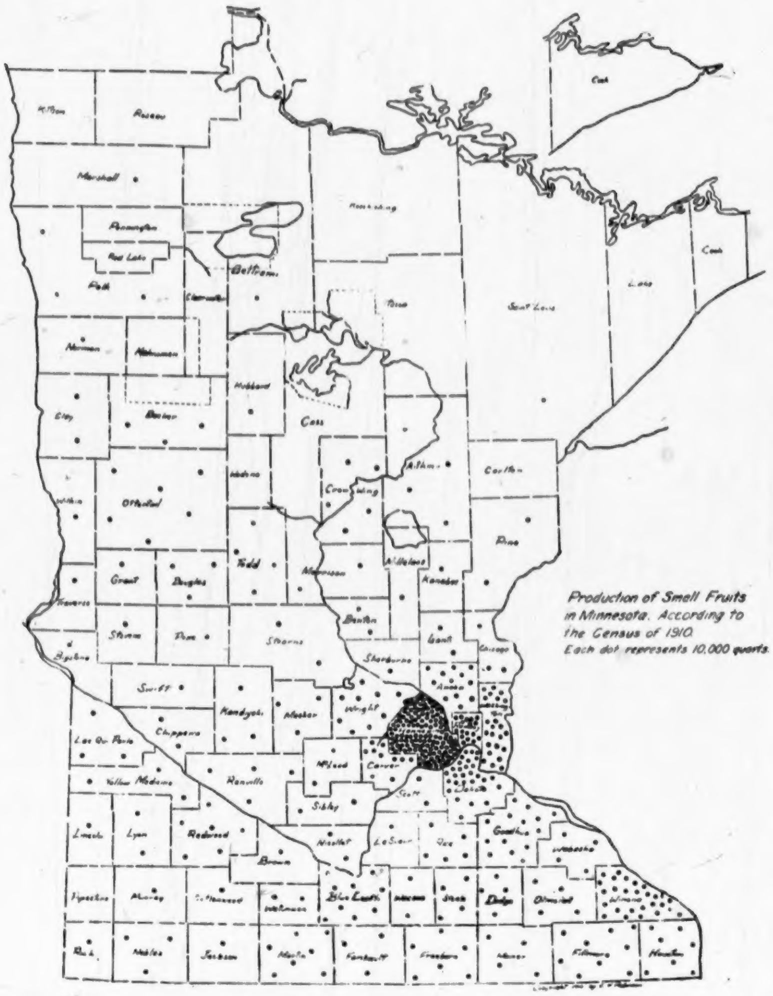

Production of Small Fruits
in Minnesota. According to
the Census of 1910.
Each dot represents 10,000 quarts.

Figure 182. Production of small fruits in 1909 according to census of 1910.

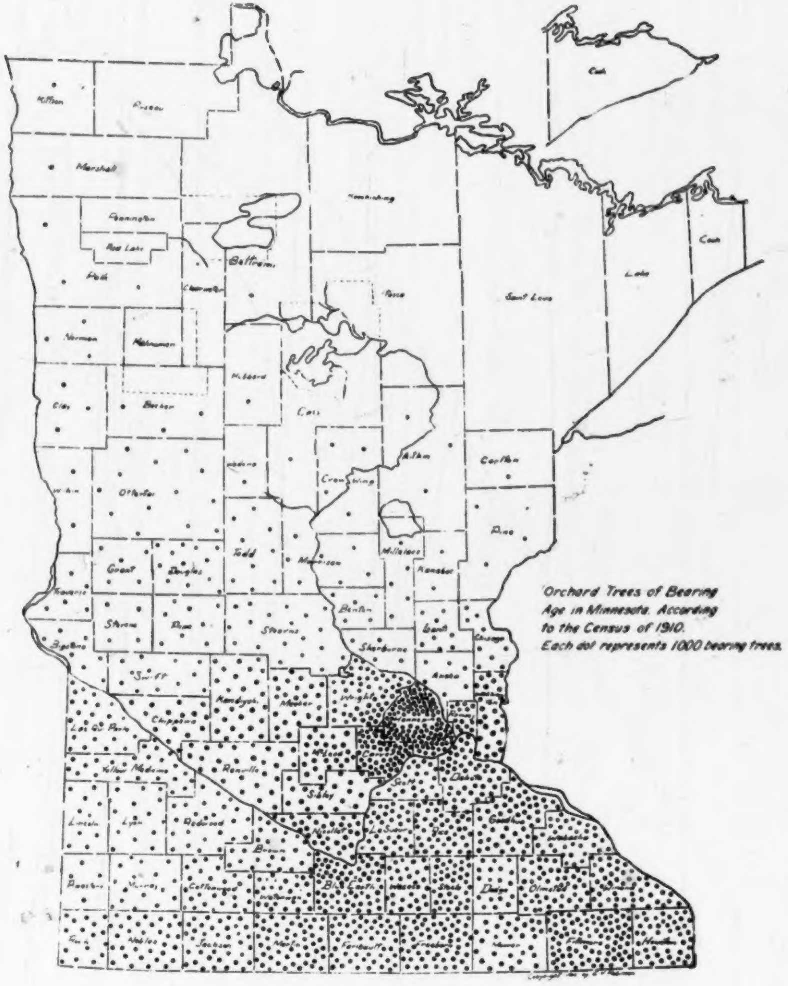

Orchard Trees of Bearing
Age in Minnesota. According
to the Census of 1910.
Each dot represents 1000 bearing trees.

Figure 183. Orchard trees of bearing age according to the census of 1910.

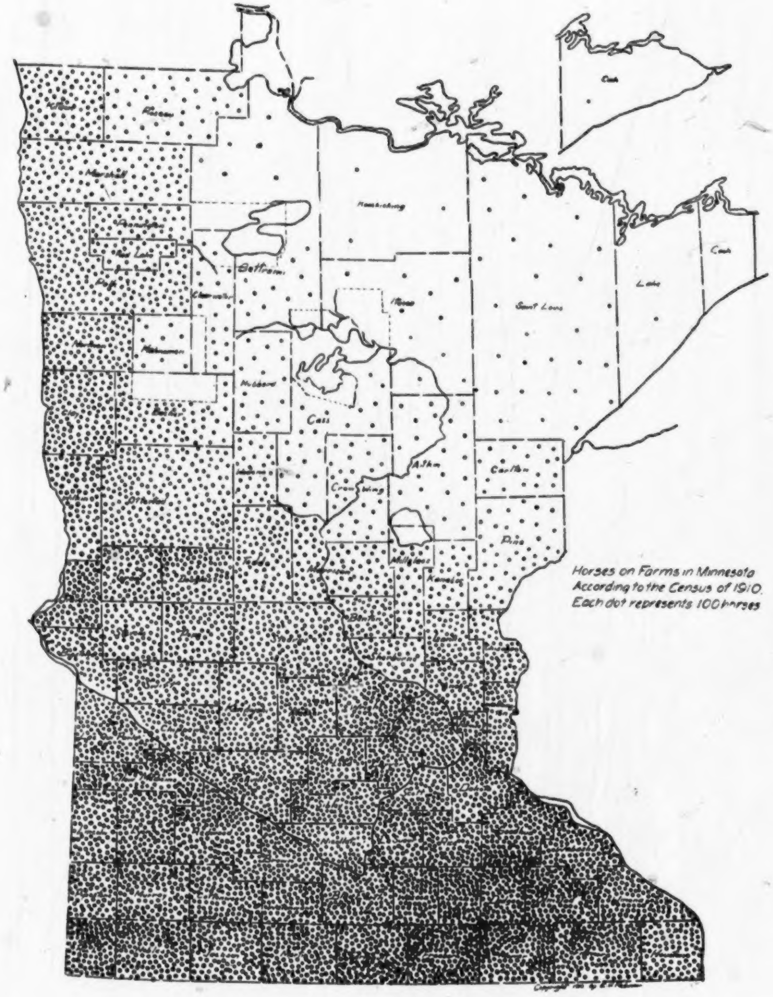

Horses on Farms in Minnesota
According to the Census of 1910.
Each dot represents 100 horses
Kittson
Roseau
Marshall
Polk
Beltrami
Koochiching
Itasca
Saint Louis
Lake
Cook
Hubbard
Cass
Aitkin
Crow Wing
Carlton
Pine

Figure 184. Distribution of horses on farms according to census of 1910.

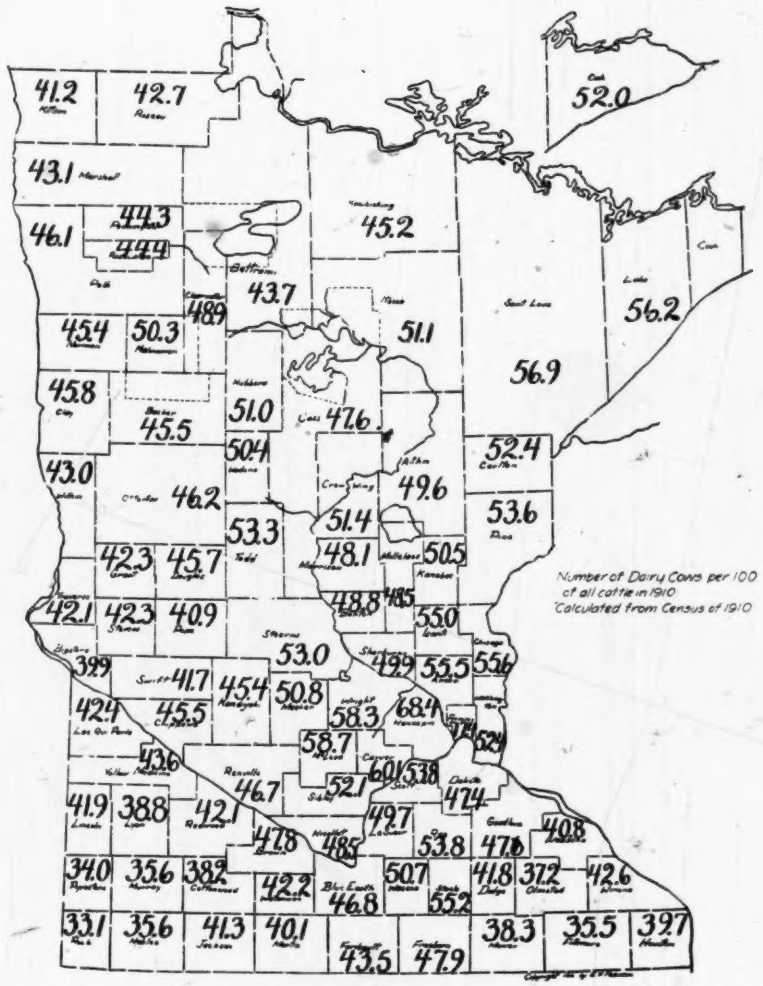

Number of Dairy Cows per 100
of all cattle in 1910
Calculated from Census of 1910
41.2 Kittson
42.7 Roseau
43.1 Marshall
44.3
44.4
46.1
Polk
Beltrami
43.7
Koochiching
45.2
Itasca
51.1
52.0 Cook
56.2 Lake
Saint Louis
56.9
48.9
45.4 Norman
50.3 Mahnomen
45.8 Clay
Becker
45.5
Hubbard
51.0
Cass
47.6
50.4 Wadena
43.0 Wilkin
Otter Tail
46.2
53.3 Todd
Crow Wing
51.4
Aitkin
49.6
52.4 Carlton
53.6 Pine
42.3 Grant
45.7 Douglas
48.1 Morrison
Mille Lacs
50.5 Kanabec
42.1
42.3 Stevens
40.9 Pope
48.8 Benton
48.5
55.0 Isanti
Stearns
53.0
Big Stone
39.9
Swift
41.7
45.4 Kandiyohi
50.8 Meeker
Sherburne
49.9
55.5 Anoka
55.6 Chisago
42.4
Lac Qui Parle
45.5 Chippewa
Wright
58.3
68.4 Hennepin
57.4 Ramsey
52.4
43.6
Yellow Medicine
Renville
46.7
58.7 McLeod
Carver
60.1
53.8
Scott
52.1
Sibley
Dakota
47.4
41.9 Lincoln
38.8 Lyon
42.1 Redwood
47.8 Brown
Nicollet
48.5
49.7 Le Sueur
Rice
53.8
Goodhue
47.6
40.8 Wabasha
34.0 Pipestone
35.6 Murray
38.2 Cottonwood
42.2 Watonwan
Blue Earth
46.8
50.7 Waseca
Steele
55.2
41.8 Dodge
37.2 Olmsted
42.6 Winona
33.1 Rock
35.6 Nobles
41.3 Jackson
40.1 Martin
Faribault
43.5
Freeborn
47.9
38.3 Mower
35.5 Fillmore
39.7 Houston

Figure 185. Number of dairy cows per 100 cattle according to census of 1910. (Based on Table XXIV)

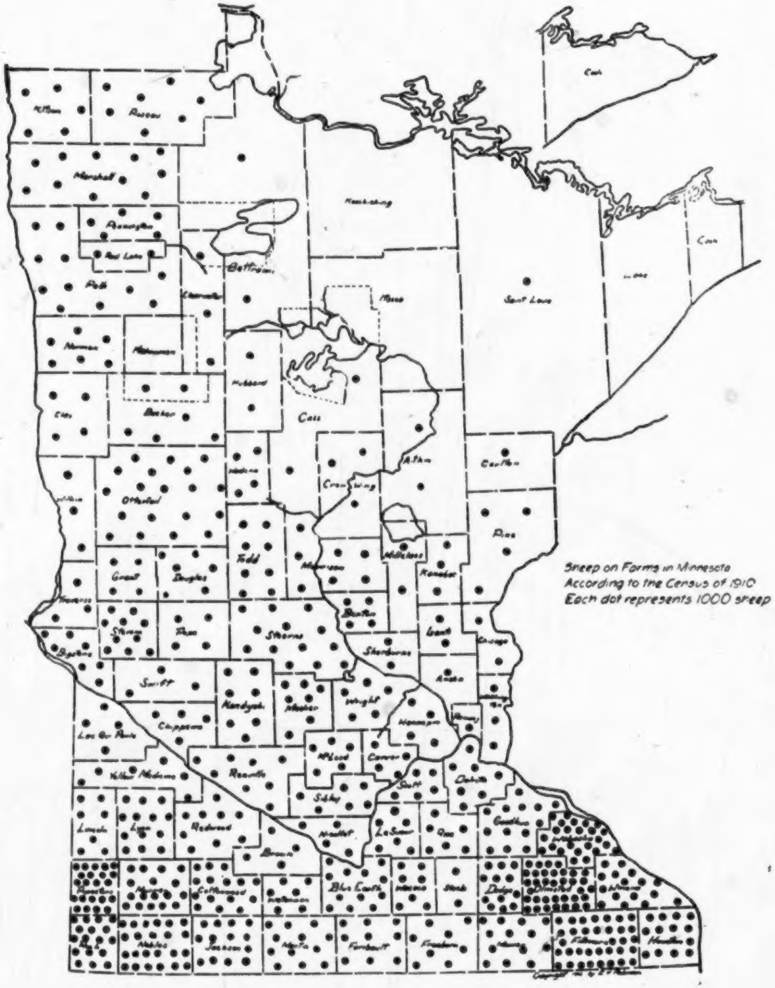

Sheep on Farms in Minnesota
According to the Census of 1910
Each dot represents 1000 sheep
Kittson
Roseau
Marshall
Pennington
Red Lake
Polk
Beltrami
Koochiching
Itasca
Saint Louis
Lake
Cook
Norman
Mahnomen
Clearwater
Hubbard
Clay
Becker
Cass
Wadena
Crow Wing
Aitkin
Carlton
Pine
Otter Tail
Wilkin
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Stevens
Pope
Stearns
Benton
Sherburne
Isanti
Chisago
Big Stone
Swift
Kandiyohi
Meeker
Wright
Anoka
Lac Qui Parle
Chippewa
Hennepin
Ramsey
Washington
Yellow Medicine
Renville
McLeod
Carver
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Brown
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

Figure 186. Distribution of sheep on farms according to census of 1910.

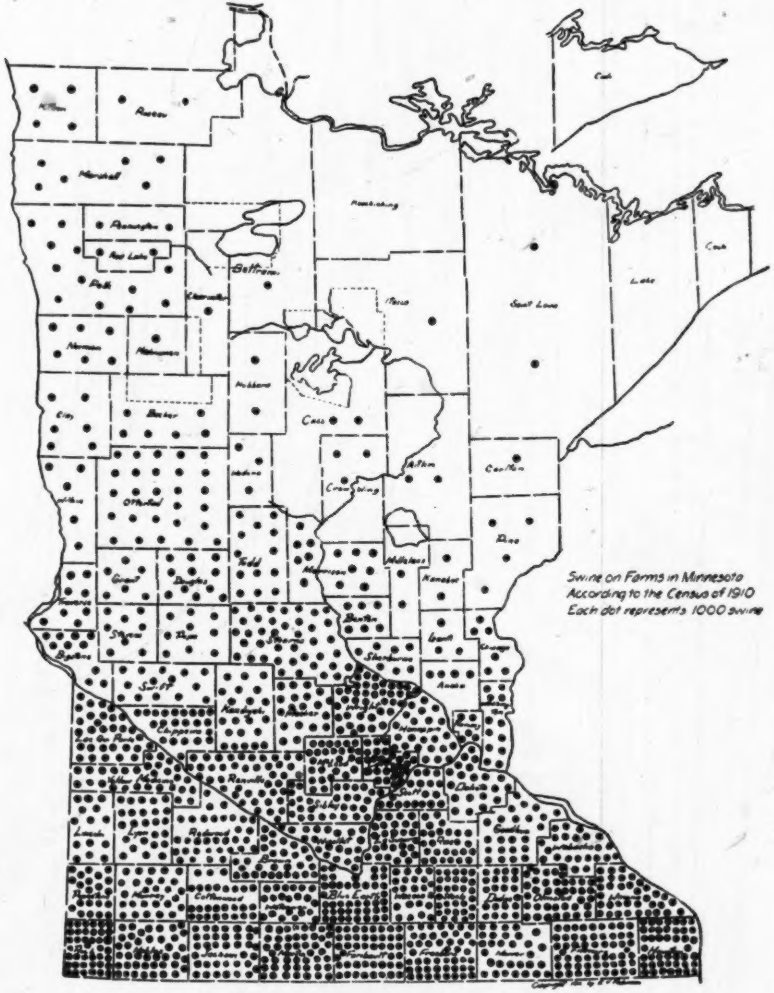

Swine on Farms in Minnesota
According to the Census of 1910
Each dot represents 1000 swine
Kittson
Roseau
Marshall
Pennington
Red Lake
Polk
Beltrami
Koochiching
Itasca
Saint Louis
Lake
Cook
Norman
Mahnomen
Clearwater
Hubbard
Clay
Becker
Cass
Wadena
Crow Wing
Aitkin
Carlton
Pine
Otter Tail
Wilkin
Todd
Morrison
Mille Lacs
Kanabec
Grant
Douglas
Traverse
Stevens
Pope
Stearns
Benton
Sherburne
Isanti
Chisago
Big Stone
Swift
Kandiyohi
Meeker
Anoka
Chippewa
Hennepin
Ramsey
Renville
Sibley
Dakota
Lincoln
Lyon
Redwood
Goodhue
Wabasha
Pipestone
Murray
Cottonwood
Blue Earth
Dodge
Olmsted
Winona
Houston

Figure 187. Distribution of swine on farms according to the census of 1910. (Based on Table XXVII)

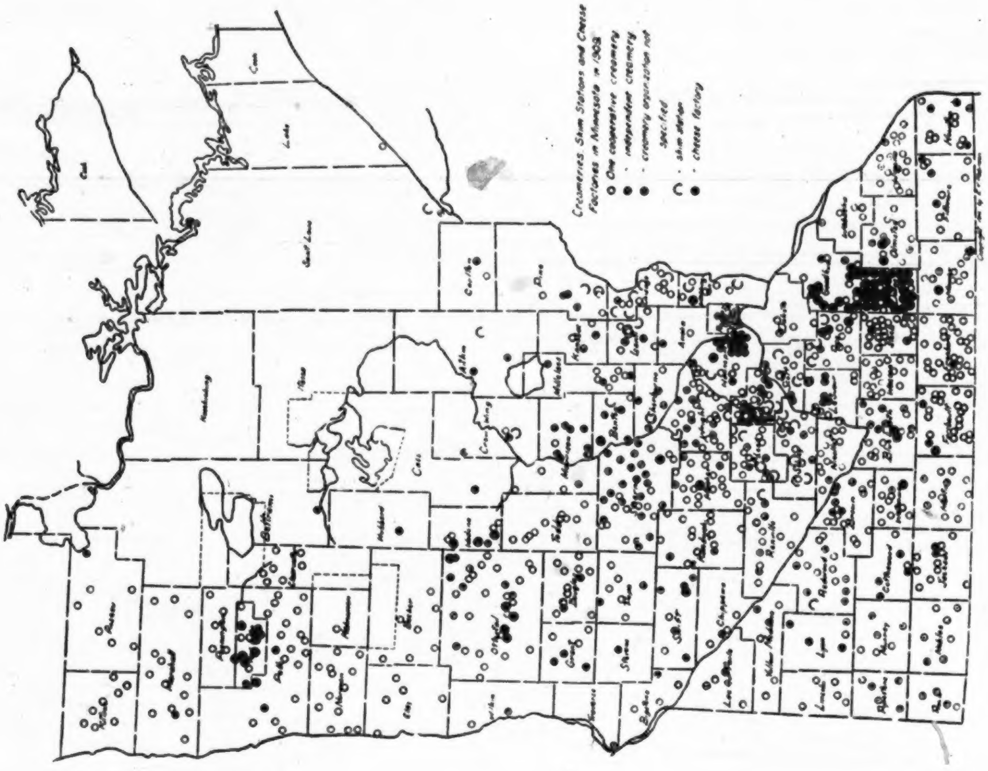

Creameries, Skim Stations and Cheese Factories in Minnesota in 1909
○ One cooperative creamery
● independent creamery
creamery, organization not specified
skim station
C● cheese factory
Cook
Lake
Saint Louis
Koochiching
Cass
Carlton
Pine
Beltrami

Figure 189. Distribution and organization of creameries, skim stations, and cheese factories in 1909.[46]

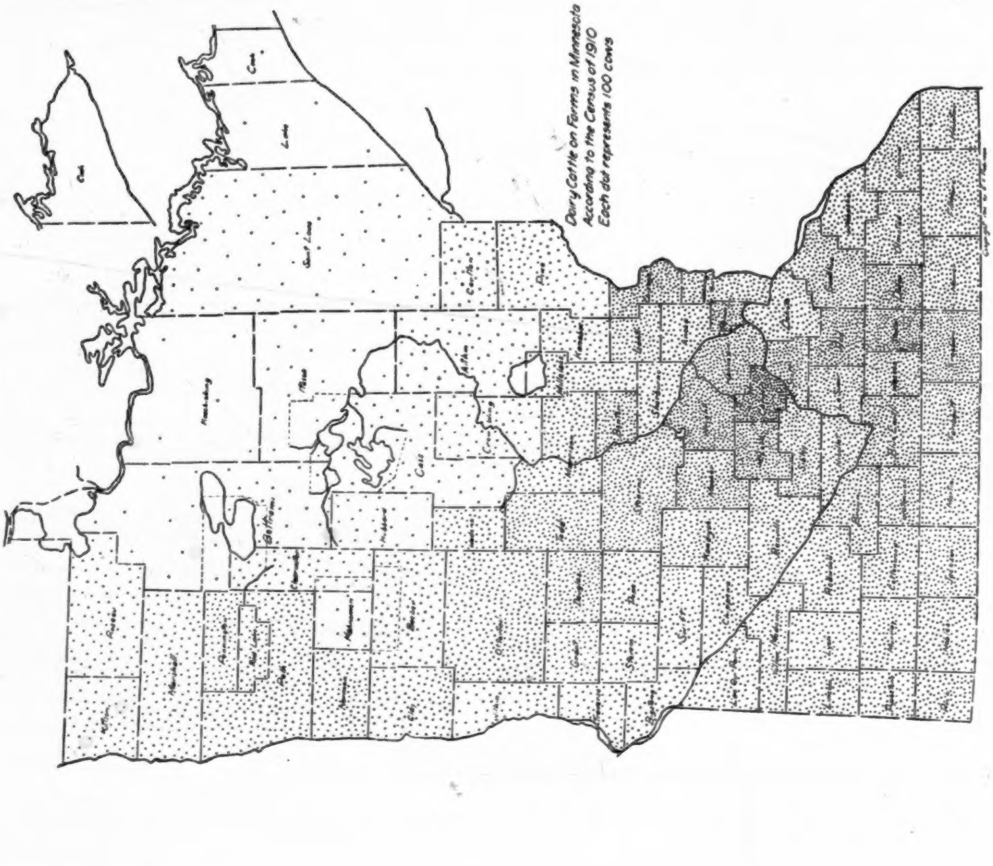

Dairy Cattle on Farms in Minnesota
According to the Census of 1910
Each dot represents 100 cows
Cook
Lake
Saint Louis
Koochiching
Cass
Carlton
Pine
Beltrami

Figure 188. Distribution of dairy cows on farms according to the census of 1910. (Based on Table XXIV.

---

[46] *Report of State Dairy and Food Commissioner*, 1909, 54-79.

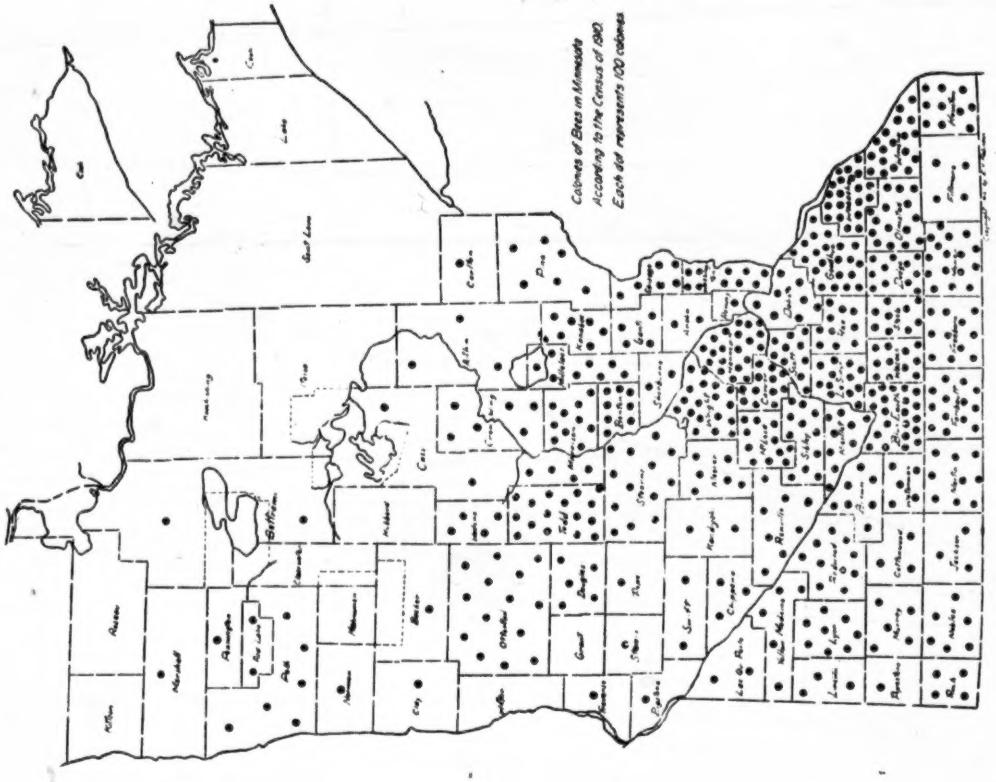

Colonies of Bees in Minnesota
According to the Census of 1910
Each dot represents 100 colonies

Figure 191. Distribution of bees on farms according to the census of 1910. (Based on Table XXIX)

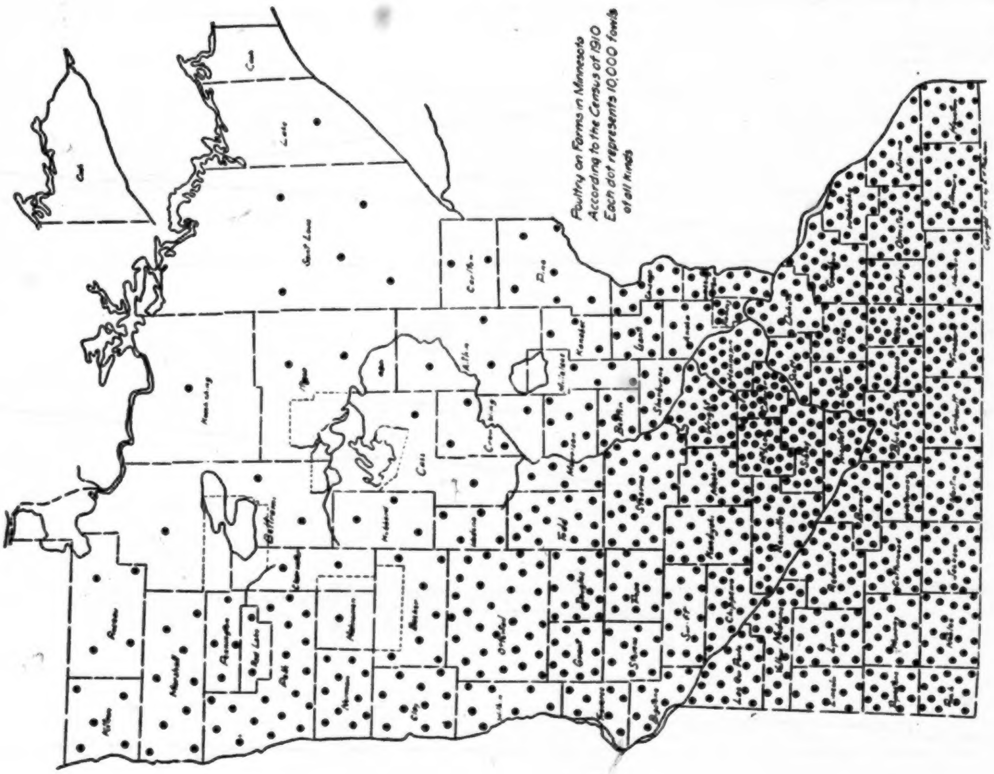

Poultry on Farms in Minnesota
According to the Census of 1910
Each dot represents 10,000 fowls
of all kinds

Figure 190. Distribution of poultry on farms according to the census of 1910. (Based on Table XXVIII)

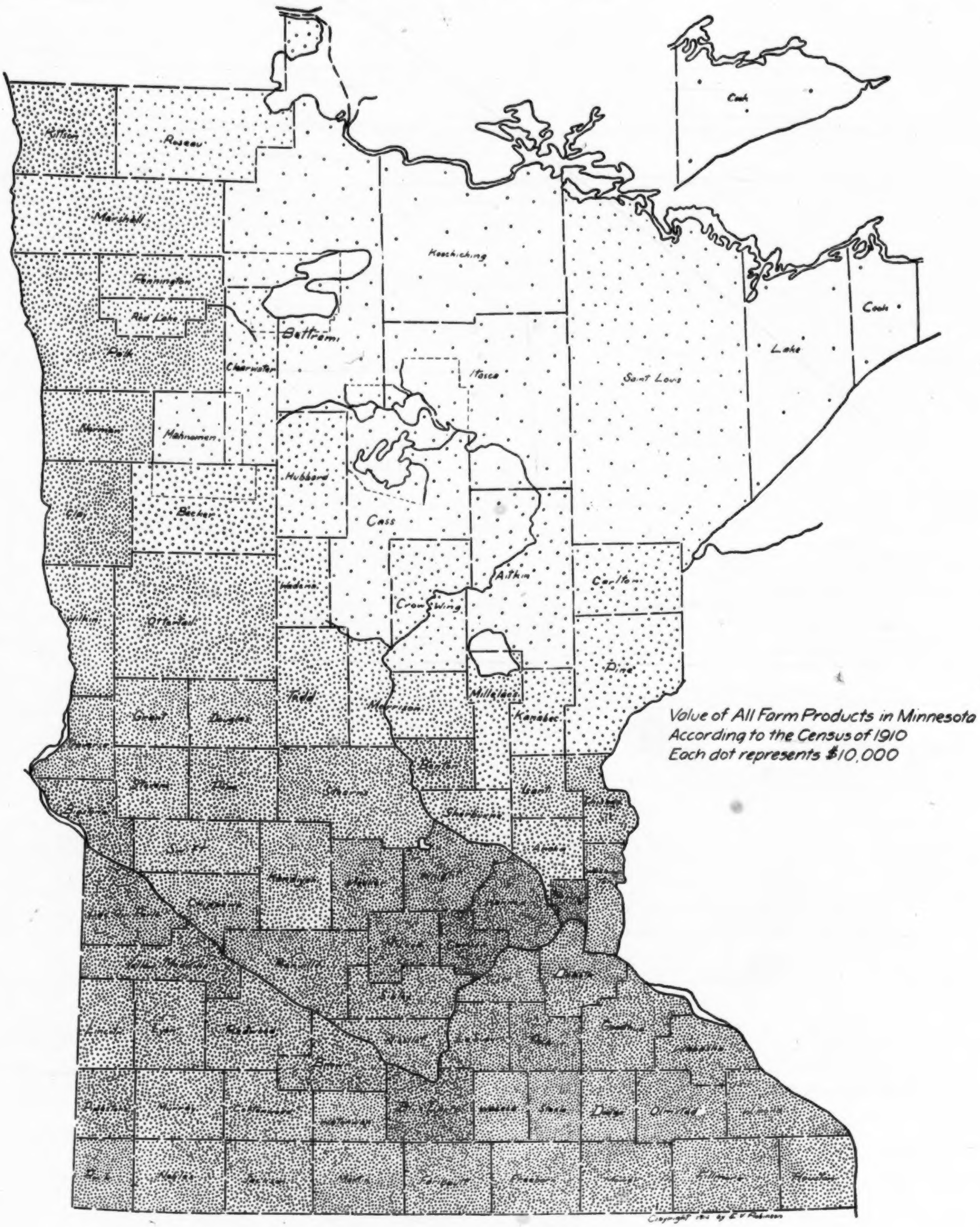

Value of All Farm Products in Minnesota
According to the Census of 1910
Each dot represents $10,000
Kittson
Roseau
Marshall
Pennington
Red Lake
Polk
Norman
Mahnomen
Clay
Becker
Clearwater
Beltrami
Koochiching
Itasca
Saint Louis
Lake
Cook
Hubbard
Cass
Wadena
Crow Wing
Aitkin
Carlton
Pine
Wilkin
Ottertail
Grant
Douglas
Todd
Morrison
Mille Lacs
Kanabec
Benton
Stevens
Pope
Stearns
Isanti
Sherburne
Anoka
Swift
Kandiyohi
Meeker
Wright
Chippewa
Renville
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
Le Sueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston
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Figure 192. Distribution of value of farm products in 1909 according to census of 1910. (Based on Table XXXV)

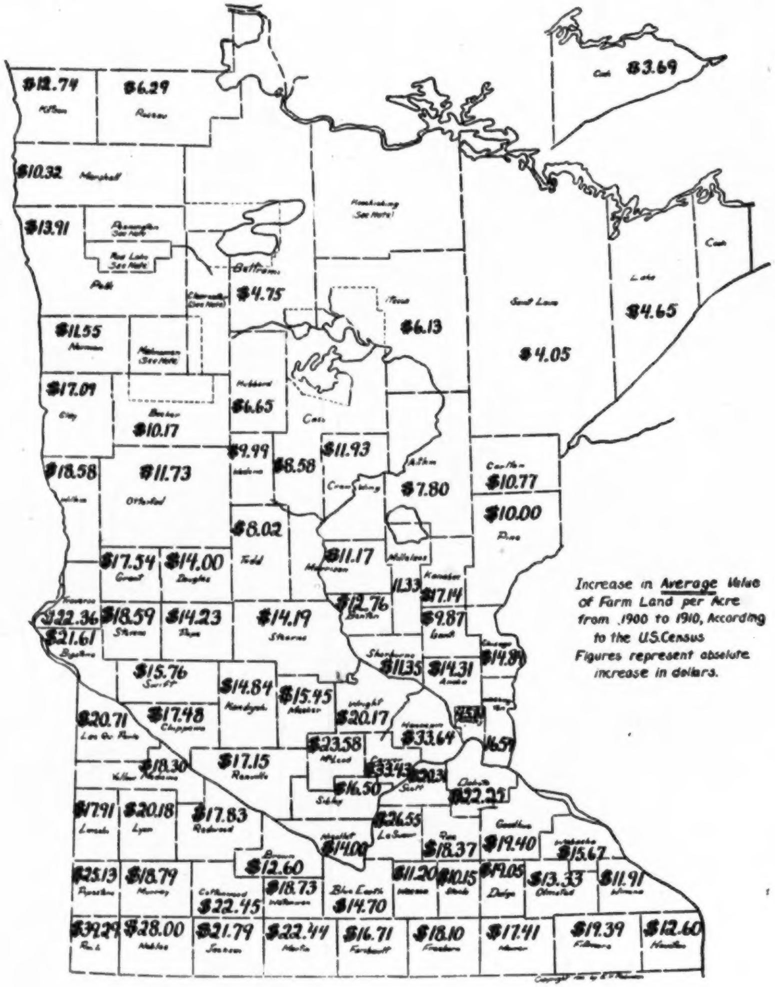
Increase in Average Value of Farm Land per Acre from 1900 to 1910, According to the U.S.Census Figures represent absolute increase in dollars.
$12.74 Kittson
$6.29 Roseau
$10.32 Marshall
$13.91 Polk
Pennington See Note
Red Lake See Note
Clearwater (See Note)
Beltrami $4.75
Koochiching (See Note)
Itasca $6.13
Saint Louis $4.05
Lake $4.65
Cook $3.69
$11.55 Norman
Mahnomen (See Note)
$17.09 Clay
Becker $10.17
Hubbard $6.65
Cass
$9.99 Wadena
$8.58
$11.93 Crow Wing
Aitkin $7.80
Carlton $10.77
$10.00 Pine
$18.58 Wilkin
$11.73 Otter Tail
$8.02 Todd
$11.17 Morrison
Mille Lacs
11.33
Kanabec $17.14
$17.54 Grant
$14.00 Douglas
Traverse $22.36
$21.61 Bigstone
$18.59 Stevens
$14.23 Pope
$14.19 Stearns
$12.76 Benton
$9.87 Isanti
Chisago $14.80
Sherburne $11.35
$14.31 Anoka
$15.76 Swift
$14.84 Kandiyohi
$15.45 Meeker
Wright $20.17
$20.71 Lac Qui Parle
$17.48 Chippewa
Hennepin $33.64
16.59
$23.58 McLeod
Carver $33.43
$20.31 Scott
$18.30 Yellow Medicine
$17.15 Renville
$16.50 Sibley
Dakota $22.25
$17.91 Lincoln
$20.18 Lyon
$17.83 Redwood
$26.55 Le Sueur
Rice $18.37
Goodhue $19.40
Wabasha $15.67
Nicollet $14.00
Brown $12.60
$25.13 Pipestone
$18.79 Murray
Cottonwood $22.45
$18.73 Watonwan
Blue Earth $14.70
$11.20 Waseca
$10.15 Steele
$19.05 Dodge
$13.33 Olmsted
$11.91 Winona
$39.29 Rock
$28.00 Nobles
$21.79 Jackson
$22.44 Martin
$16.71 Faribault
$18.10 Freeborn
$17.41 Mower
$19.39 Fillmore
$12.60 Houston

Figure 193. Increase in average value of farm land per acre, 1900-1910.[47]

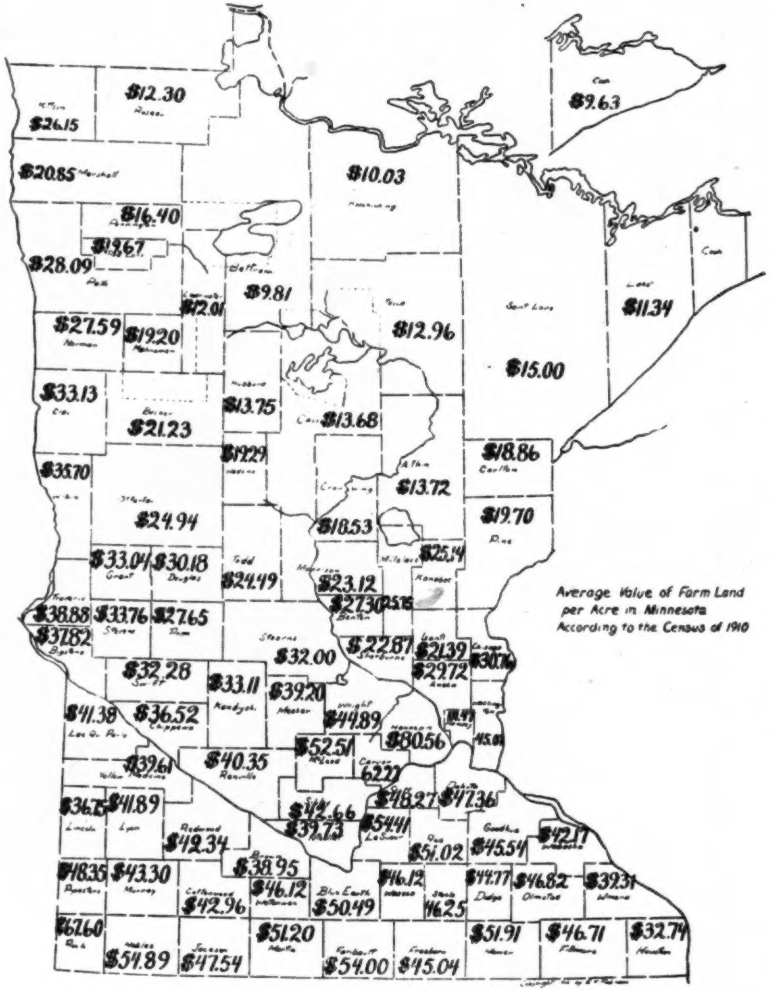
Average Value of Farm Land per Acre in Minnesota According to the Census of 1910
Kittson $26.15
$12.30 Roseau
$20.85 Marshall
$16.40 Pennington
$19.67 Red Lake
$28.09 Polk
Clearwater $12.01
Beltrami $9.81
$10.03 Koochiching
Itasca $12.96
Saint Louis $15.00
Lake $11.34
Cook $9.63
$27.59 Norman
$19.20 Mahnomen
$33.13 Clay
Becker $21.23
Hubbard $13.75
Cass $13.68
$12.29 Wadena
Aitkin $13.72
$18.86 Carlton
$19.70 Pine
$35.70 Wilkin
Otter Tail $24.94
$18.53
$25.14 Mille Lacs
Kanabec
$33.04 Grant
$30.18 Douglas
Todd $24.49
Morrison $23.12
Traverse $38.88
$37.82 Bigstone
$33.76 Stevens
$27.65 Pope
$27.30 Benton
25.16
Stearns $32.00
$22.87 Sherburne
Isanti $21.39
Chisago $30.76
$29.72 Anoka
$32.28 Swift
$33.11 Kandiyohi
$39.20 Meeker
Wright $44.89
$41.38 Lac Qui Parle
$36.52 Chippewa
Hennepin $80.56
$18.47 Ramsey
45.01
$52.51 McLeod
Carver 62.27
$39.61 Yellow Medicine
$40.35 Renville
Scott $48.27
Dakota $47.36
$36.75 Lincoln
$41.89 Lyon
Sibley $42.66
$39.73 Nicollet
$54.41 Le Sueur
Redwood $42.34
Rice $51.02
Goodhue $45.54
$42.17 Wabasha
Brown $38.95
$48.35 Pipestone
$43.30 Murray
Cottonwood $42.96
$46.12 Watonwan
Blue Earth $50.49
$46.12 Waseca
Steele 46.25
$44.77 Dodge
$46.82 Olmsted
$39.31 Winona
$67.60 Rock
Nobles $54.89
Jackson $47.54
$51.20 Martin
Faribault $54.00
Freeborn $45.04
$51.91 Mower
$46.71 Fillmore
$32.74 Houston

Figure 194. Average value of farm land per acre according to census of 1910. (Average for state, $36.82)

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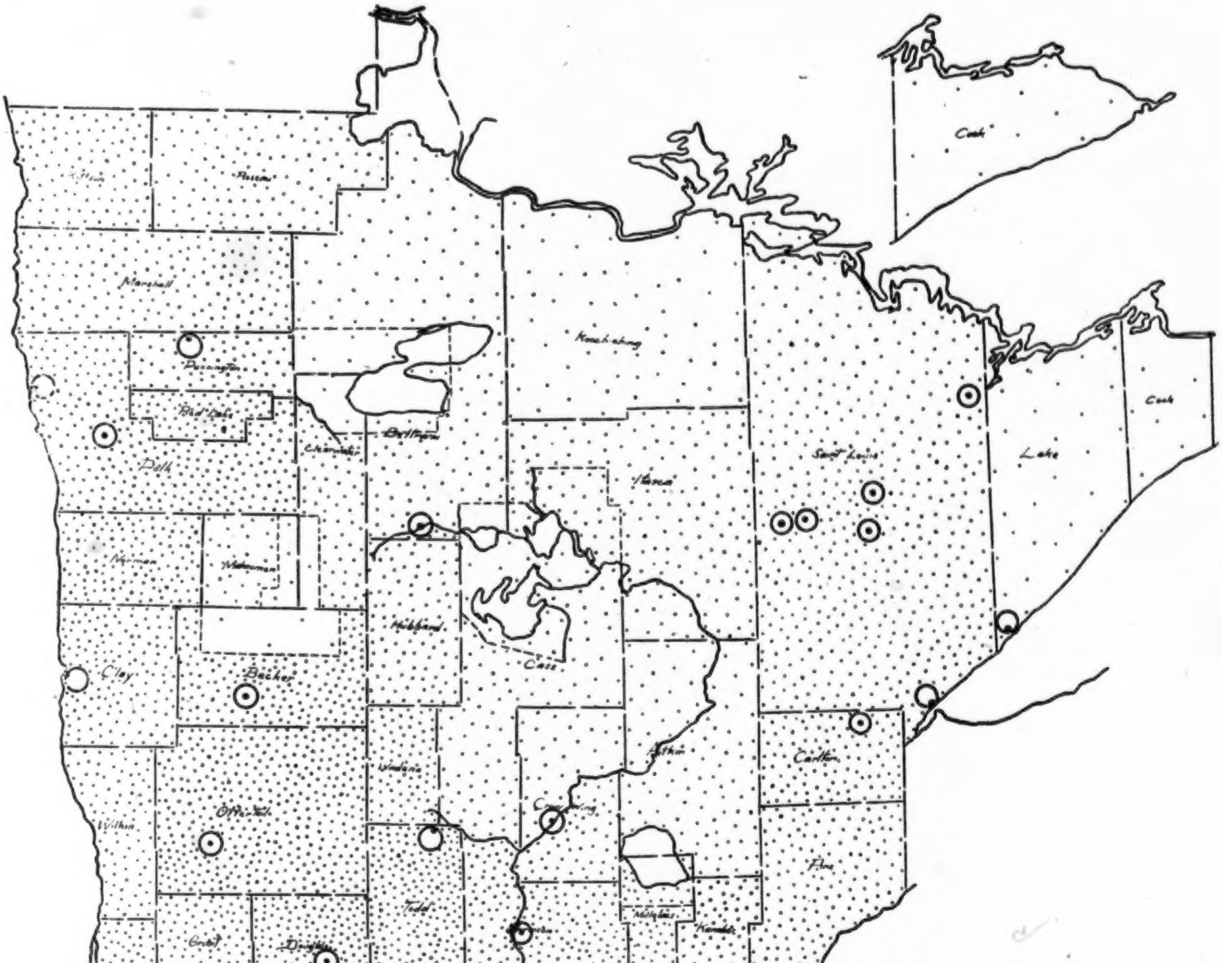
[47] Counties left blank were formed or had their boundaries changed during the decade, so that a fair comparison is not possible.


Cook
Cook
Lake
Saint Louis
Koochiching
Marshall
Pennington
Red Lake
Polk
Norman
Clay
Becker
Hubbard
Cass
Carlton
Pine
Wilkin
Otter Tail
Todd
Grant
Douglas
Traverse
Stevens
Pope
Stearns
Benton
Sherburne
Swift
Meeker
Wright
Chisago
Kandiyohi
Lac Qui Parle
Yellow Medicine
Renville
McLeod
Carver
Scott
Sibley
Dakota
Goodhue
Wabasha
Redwood
Lyon
Brown
Blue Earth
Murray
Cottonwood
Jackson
Rice
Dodge
Olmsted
Winona
Nobles
Martin
Freeborn
Mower
Fillmore
Houston
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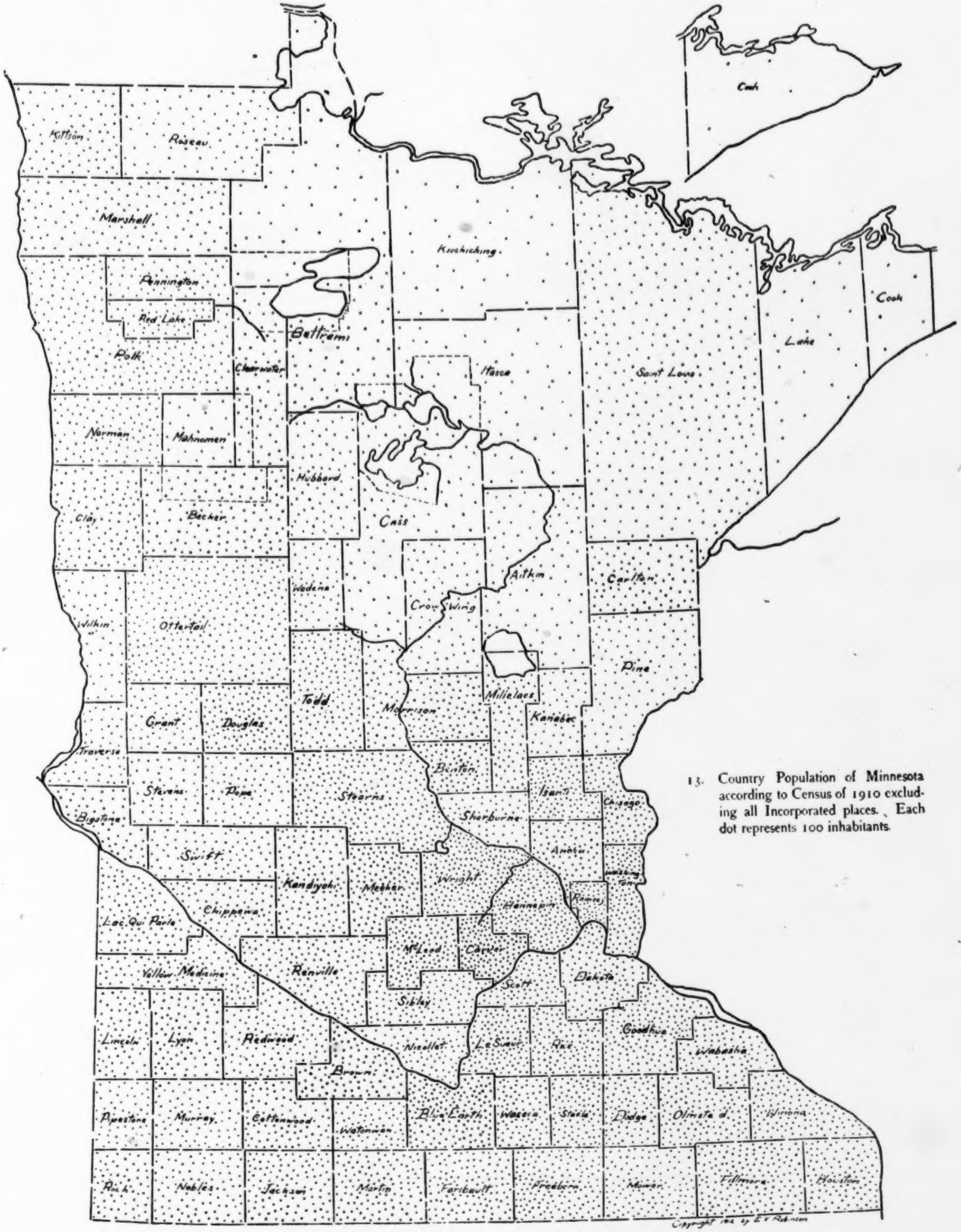
6. Rural Population of Minnesota according to Census of 1910 including Cities and Villages of less than 2500 Population.
Each dot represents 100 Inhabitants.
Each circle represents Incorporated Place of 2500 or more Inhabitants.

Figure 195. Distribution of population according to census of 1910. (Based on Table XI)


Cook
Kittson
Roseau
Marshall
Koochiching
Pennington
Red Lake
Beltrami
Polk
Clearwater
Itasca
Saint Louis
Lake
Cook
Norman
Mahnomen
Hubbard
Clay
Becker
Cass
Aitkin
Carlton
Wadena
Crow Wing
Wilkin
Ottertail
Pine
Todd
Morrison
Millelacs
Kanabec
Grant
Douglas
Traverse
Benton
Stevens
Pope
Stearns
Isanti
Chisago
Bigstone
Sherburne
Swift
Anoka
Kandiyohi
Meeker
Wright
Washington
Hennepin
Ramsey
Lac Qui Parle
Chippewa
McLeod
Carver
Yellow Medicine
Renville
Scott
Dakota
Sibley
Lincoln
Lyon
Redwood
Nicollet
LeSueur
Rice
Goodhue
Wabasha
Brown
Pipestone
Murray
Cottonwood
Watonwan
Blue Earth
Waseca
Steele
Dodge
Olmsted
Winona
Rock
Nobles
Jackson
Martin
Faribault
Freeborn
Mower
Fillmore
Houston

13. Country Population of Minnesota according to Census of 1910 excluding all Incorporated places. Each dot represents 100 inhabitants.

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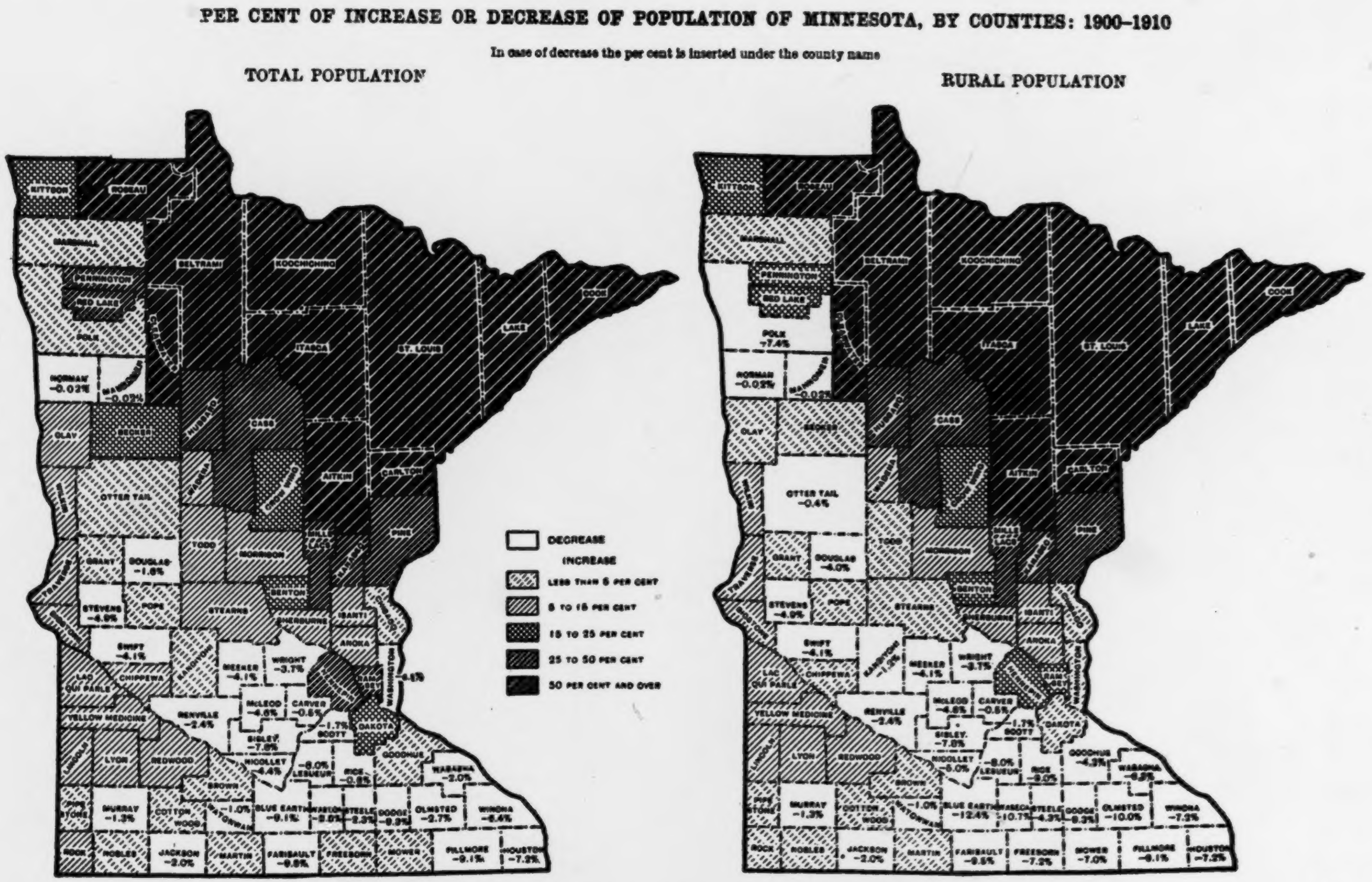
Figure 196. Distribution of country population according to census of 1910. (Based on Table XI)


PER CENT OF INCREASE OR DECREASE OF POPULATION OF MINNESOTA, BY COUNTIES: 1900-1910

In case of decrease the per cent is inserted under the county name

TOTAL POPULATION
RURAL POPULATION
DECREASE
INCREASE
LESS THAN 5 PER CENT
5 TO 15 PER CENT
15 TO 25 PER CENT
25 TO 50 PER CENT
50 PER CENT AND OVER
KITTSON
ROSEAU
MARSHALL
BELTRAMI
KOOCHICHING
PENNINGTON
RED LAKE
POLK
POLK -7.4%
NORMAN -0.02%
ITASCA
ST. LOUIS
LAKE
COOK
CLAY
BECKER
CASS
AITKIN
CARLTON
OTTER TAIL
OTTER TAIL -0.4%
TODD
MORRISON
PINE
GRANT
DOUGLAS -1.8%
DOUGLAS -4.0%
STEVENS -4.0%
POPE
STEARNS
BENTON
ISANTI
ANOKA
SWIFT -4.1%
CHIPPEWA
MEEKER -4.1%
WRIGHT -3.7%
WASHINGTON
LAC QUI PARLE
YELLOW MEDICINE
RENVILLE -2.4%
MCLEOD -4.6%
CARVER -0.5%
-1.7% SCOTT
DAKOTA
SIBLEY -7.0%
LYON
REDWOOD
NICOLLET -4.4%
NICOLLET -5.0%
-8.0% LESUEUR
RICE
GOODHUE
GOODHUE -4.3%
WABASHA -2.0%
BROWN
MURRAY -1.3%
COTTON-WOOD
BLUE EARTH -9.1%
BLUE EARTH -12.4%
WASECA
STEELE
DODGE
OLMSTED -2.7%
OLMSTED -10.0%
WINONA -8.4%
WINONA -7.2%
ROCK
NOBLES
JACKSON -2.0%
MARTIN
FARIBAULT -9.9%
FREEBORN
FREEBORN -7.2%
MOWER
MOWER -7.0%
FILLMORE -9.1%
HOUSTON -7.2%

Rural population is defined as that residing outside of incorporated places having 2,500 inhabitants or more.

Figure 197. Percentage of change in total and in rural population, 1900-1910.[48]

[48]Map from the Thirteenth Census.

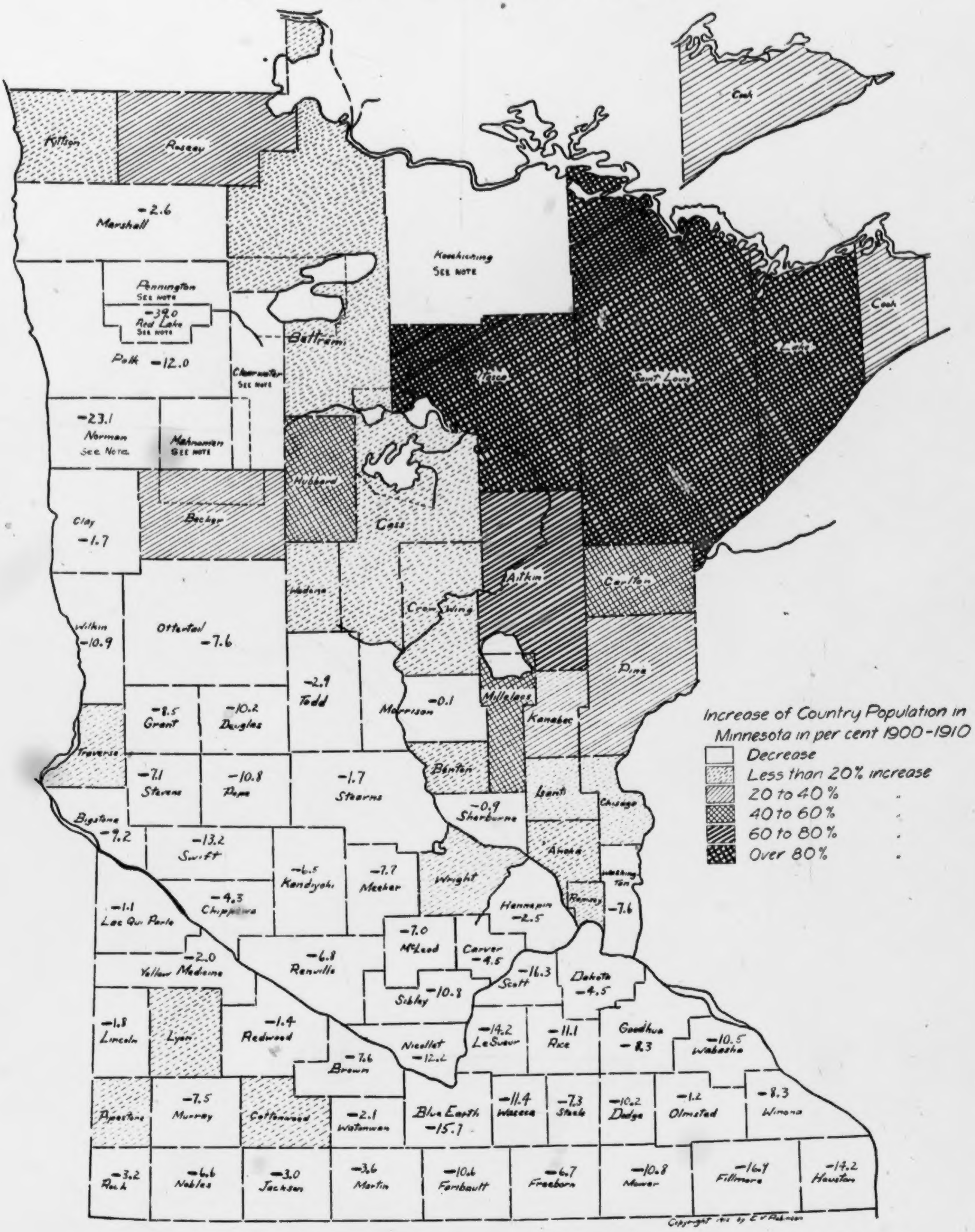

Kittson
Roseau
Cook
Marshall -2.6
Koochiching
See note
Pennington
See note
-39.0
Red Lake
See note
Beltrami
Polk -12.0
Clearwater
See note
Itasca
Saint Louis
Lake
Cook
-23.1
Norman
See Note
Mahnomen
See note
Hubbard
Clay -1.7
Becker
Cass
Aitkin
Carlton
Wadena
Crow Wing
Wilkin -10.9
Ottertail -7.6
Pine
-2.9 Todd
Morrison -0.1
Millelacs
Kanabec
-8.5 Grant
-10.2 Douglas
Traverse
Benton
-7.1 Stevens
-10.8 Pope
-1.7 Stearns
Isanti
-0.9 Sherburne
Chisago
Bigstone -9.2
-13.2 Swift
Anoka
-6.5 Kandiyohi
-7.7 Meeker
Wright
Washington -7.6
Hennepin -2.5
Ramsey
-1.1 Lac Qui Parle
-4.3 Chippewa
-7.0 McLeod
Carver -4.5
-2.0 Yellow Medicine
-6.8 Renville
-16.3 Scott
Dakota -4.5
Sibley -10.8
-1.8 Lincoln
Lyon
-1.4 Redwood
-14.2 LeSueur
-11.1 Rice
Goodhue -8.3
-10.5 Wabasha
-7.6 Brown
Nicollet -12.2
Pipestone
-7.5 Murray
Cottonwood
-2.1 Watonwan
Blue Earth -15.7
-11.4 Waseca
-7.3 Steele
-10.2 Dodge
-1.2 Olmsted
-8.3 Winona
-3.2 Rock
-6.6 Nobles
-3.0 Jackson
-3.6 Martin
-10.6 Faribault
-6.7 Freeborn
-10.8 Mower
-16.7 Fillmore
-14.2 Houston
Increase of Country Population in Minnesota in per cent 1900-1910
Decrease
Less than 20% increase
20 to 40 % "
40 to 60 % "
60 to 80 % "
Over 80 % "
Copyright 1912 by E V Robinson

Figure 198. Percentage of change in country population, 1900-1910, according to the Thirteenth Census.[49] (Based on Table XI)

[49] Counties marked "see note" were formed or changed as to boundaries during the decade; hence the rates of change could not be ascertained on the same basis.

Summary of agricultural development, 1900-1910

In order to bring clearly to view the extent and direction of agricultural changes during the decade 1900-1910, a table is presented at the end of the chapter showing the percentage of increase or decrease during that period and also the relation of each item to the total country population. The figures relate to the State as a whole, irrespective of counties.

Proportion of land used for agriculture

The total land in farms increased from 26.2 to 27.7 million acres, or 5.4 per cent; unimproved land in farms from 7.8 to 8 million acres or 2.9 per cent; and improved land in farms, from 18.4 to 19.6 million acres, or 6.5 per cent. The total percentage of farm land improved thus rose from 70.3 to 71; and the percentage of land area in farms increased from 50.7 to 53.5 per cent. From these figures it is readily calculated that the ratio of improved farm land to total land area was 35.64 in 1900 and 37.98 in 1910 (Items 4-13, Table 24).

It will be noted that improved land in farms increased 1.2 million acres against 0.2 million acres of unimproved land. This clearly indicates that the extensive margin of cultivation was descending on farms previously established. Nevertheless, the low rate of increase in improved land (6.5 per cent) shows that the pressure upon the extensive margin was not severe; and it may be inferred that so long as the farming population does not increase considerably or more intensive farming of the better lands proves profitable, cultivation will not readily descend to the poorer lands unless there is a still greater advance in the prices of farm products. The relation of these changes to previous decades is shown in Figs. 199, 213.

The slowing-up of agricultural extension

The striking fact in the accompanying diagram is the slowing-up of agricultural extension in Minnesota since 1900, in spite of the large area not yet included in farms. The explanation lies near at hand. So long as prairie homesteads could be had for the taking, ready for the plow, agricultural settlement went on apace; but prairie land of this character was practically all occupied, or at least in private hands, by 1900. Since that date the unoccupied lands have been found mostly in the forested or cut-over districts (Figs. 153, 161). To a generation accustomed to the quick and easy method of establishing a farm on the prairies, the clearing-away of the wreck left by the lumberman and by the forest fires which followed hard on his heels, if indeed they did not precede him, has seemed a formidable task. At best, it is undeniable that pine stumps, left in place, hinder the full use of the land for many years; and that their removal by machinery or dynamite demands a larger investment of capital than most of the settlers are able to afford for some years. Moreover, attempts have sometimes been made to sell settlers land better suited to the growth of forests than of farm products; and these attempts, even when unsuccessful, have tended to discourage settlement in the coniferous zone. For these reasons many thousands have passed by Minnesota, preferring the prairie lands farther west, even in the semi-arid zone or in Canada. This westward movement has moreover been increased by the unusual rainfall of the last few years in the normally arid Great Plains region, and by the effective advertising of these western lands.

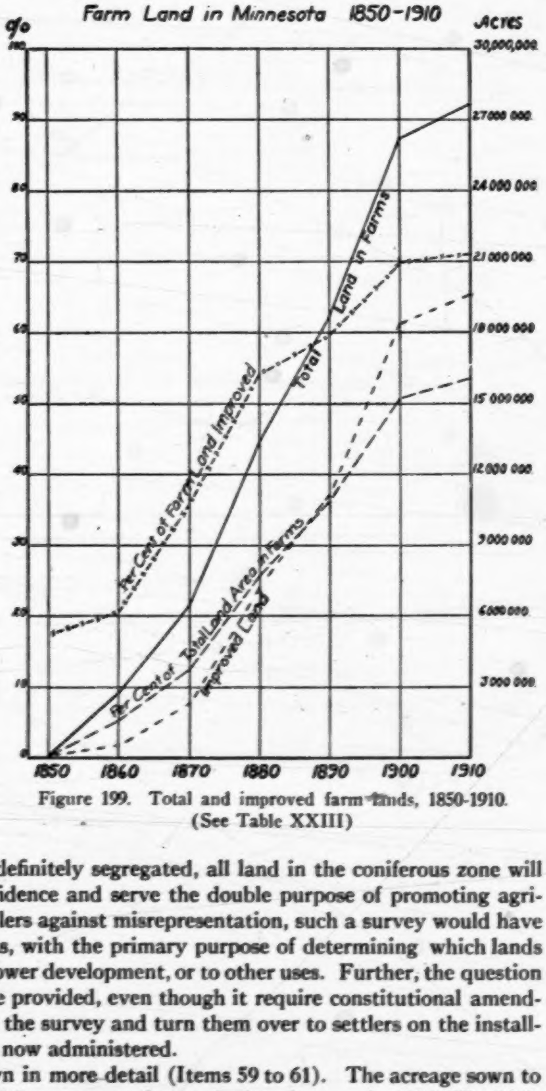


Figure 199. Total and improved farm lands, 1850-1910.
(See Table XXIII)

In view of these facts the question may fairly be raised whether the traditional plan of leaving settlement wholly to individual initiative and decision is entirely satisfactory in face of the new problems presented by the cut-over lands. The re-establishment of the state immigration service has already resulted from these conditions. In order that all land may be devoted to that use for which it is best fitted, without long delay, costly mistakes, and unnecessary hardship, there is also imperative need of a thorough soil survey, issuing in a detailed land classification map, especially of the coniferous section. So long as some of the coniferous land is known to be non-agricultural, but has not been definitely segregated, all land in the coniferous zone will be more or less under suspicion by settlers. To command public confidence and serve the double purpose of promoting agricultural and forestry development, and at the same time protecting settlers against misrepresentation, such a survey would have to be made on scientific principles, regardless of local or special interests, with the primary purpose of determining which lands are better suited to farming than to forests, to reservoir sites for water-power development, or to other uses. Further, the question is worthy of consideration whether a revolving fund may not properly be provided, even though it require constitutional amendment, to clear the state lands which shall be classified as agricultural by the survey and turn them over to settlers on the installment plan, in somewhat the same way as federal irrigation projects are now administered.

Changes in bushel crops, 1899-1909

The great decline previously noted in wheat-growing is here shown in more detail (Items 59 to 61). The acreage sown to wheat actually fell off 50.1 per cent, while the production declined only 40.1 per cent, owing to the heavier crop in 1909 (Fig. 200). The fundamental cause of such a loss of acreage, in the face of increasing prices for wheat, was the slowing-up previously noted in agricultural extension. Wheat-growing had been maintained as the dominant industry up to 1900, chiefly by the plowing-up year by year of fresh prairie lands. As soon as the addition of new wheat lands ceased, the spread of mixed farming in the older counties at once began to reduce the total acreage planted to wheat. In the face of this decline in amount, the value of wheat nevertheless increased 10.7 per cent, indicating that the price per bushel realized by the farmer had approximately doubled. Owing to this phenomenal advance in price, though both acreage and yield had fallen off compared to the country population, there was an increased financial return per capita from the wheat crop.

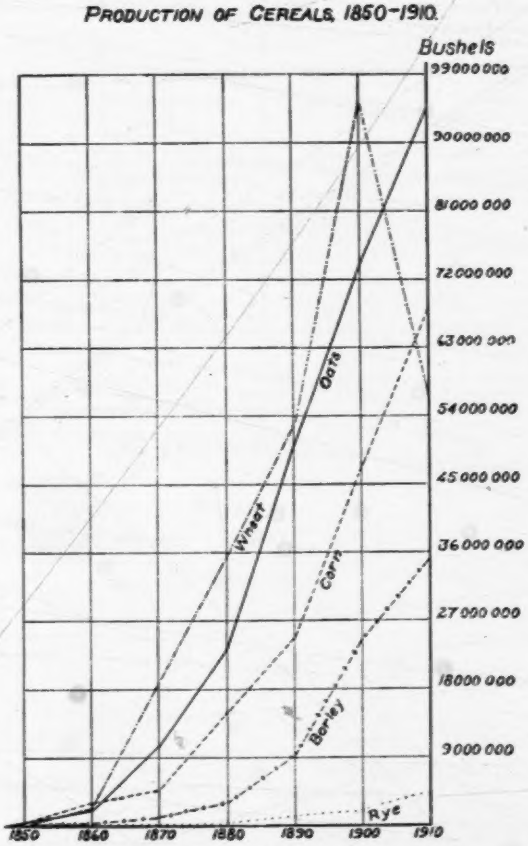


Figure 200. Production of principal cereals, 1850-1910. (Based on Tables XIII, XIV, XV, XVI, and XVII)

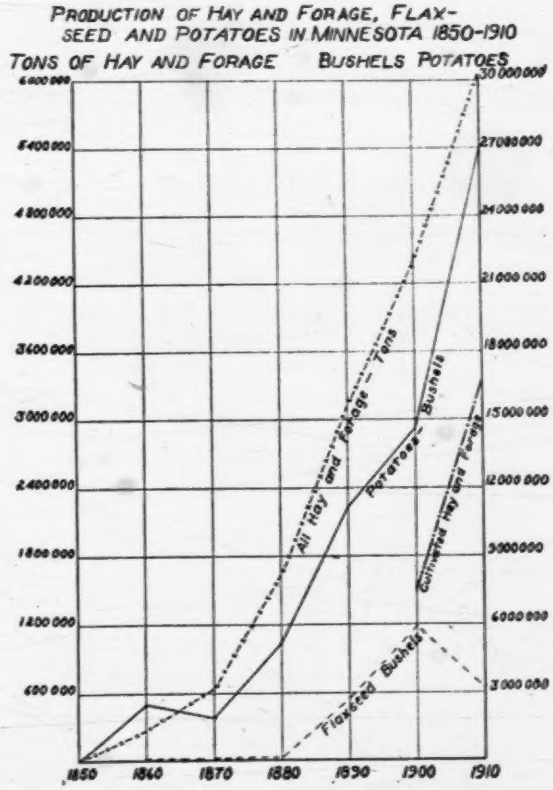


Figure 201. Production of hay and forage, flaxseed, and potatoes, 1850-1910. (Based on Tables XXII, XVIII, and XIX)

All other grains, in fact all other bushel crops except flaxseed and sweet potatoes, showed not only an absolute increase in acreage, total yield, and value, but also an increased yield and value per capita of the country population (Items 61-109; Fig. 219). Moreover, in every case the value outran the increased crops, in some cases exceeding the increase in bushels as much as four times. Thus oats, with a gain of 26.8 per cent in amount, showed an increase of 114.9 per cent in value; and the corn crop, larger by 43.7 per cent, was worth 169.1 per cent more money. The totals for all small grains showed a loss of 16.7 per cent in acreage and 2.2 per cent in bushels, yet an increase of 48.2 per cent in value. Evidently the average price to the farmer had increased fully 50 per cent. The same conclusion is indicated for all bushel crops, since they increased in the aggregate only 10 per cent in amount but 62.3 per cent in value.

As a result of these changes, wheat, though still occupying more land than any other crop, and also ranking first in value, was exceeded in amount by both oats and corn (Fig. 200). The crop fourth in rank, measured by value, was barley. Notable increases also occurred in all the minor grains, as well as in grass seed (largely timothy) and clover seed.

Changes in other crops, 1899-1909

Hay and forage crops increased 25 per cent in acreage and 39.1 per cent in tonnage, a decline in wild hay being more than offset by the gain in tame grasses. This change was the natural consequence of a decline in wheat-farming (Items 110-145; Fig. 201).

The principal decreases among the miscellaneous products were in broom corn, sorghum, and maple sugar. On the other hand, slight increases were reported in tobacco and sugar beets, though neither had as yet attained importance (Items 146-175).

More important gains were recorded in market-gardening, orchard fruits, and nursery products. In fact, the increase in fruit trees since 1890 and in value of fruits since 1900 has been fairly spectacular (Items 183-222; Fig. 203). Small fruits, on the other hand, declined slightly in yield, though increasing in acreage and value. It is noteworthy that the increase in tree fruits was chiefly confined to apples, plums, and cherries, and in small fruits to strawberries, raspberries, and currants, most of the others showing a loss. In the case of some of the softer fruits, including grapes, there are evidently climatic difficulties not yet solved.

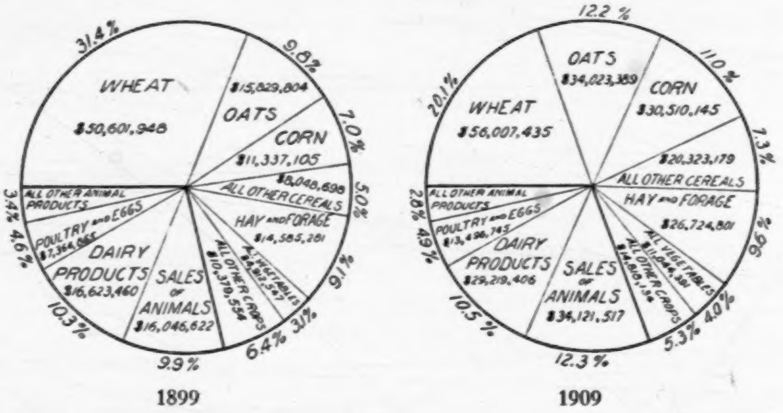


Figure 202. Relative values of principal farm products for 1899 and 1909 according to the censuses of 1900 and 1910.

Changes in domestic animals, 1900-1910

The census of 1900 was taken as of June 1, while that of 1910 was of April 15. This change renders the figures for live stock not fully comparable, as will be seen from the percentage of decrease wherever the youngest age class is given separately (Items 272, 282). The effect of this discrepancy is evident in Fig. 204, where the rate of increase from 1900 to 1910 appears as less than from 1890 to 1900, except in the case of dairy cows, which of course were not affected. The presumption is that most of the kinds of live stock would have shown at least as rapid an increase from 1900 to 1910 as during the preceding decade, had the census been taken at the same date.

Even without allowing for this discrepancy, there was a general increase in live stock, both absolute and relative to the country population. Thus, all cattle increased 25.4 per cent, steers and bulls 27.1 per cent, and dairy cows 44 per cent. Horses

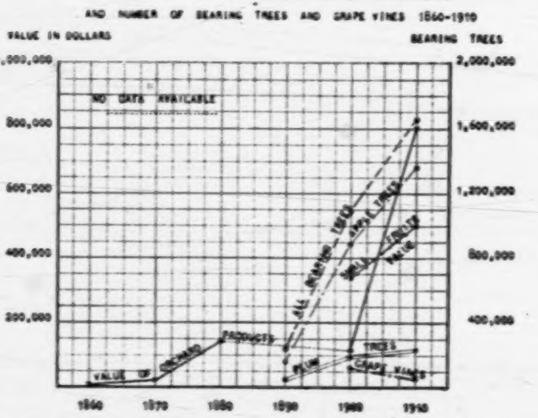


Figure 203. Fruit trees and value of fruits, 1860-1910. (Based on Table XXIII)

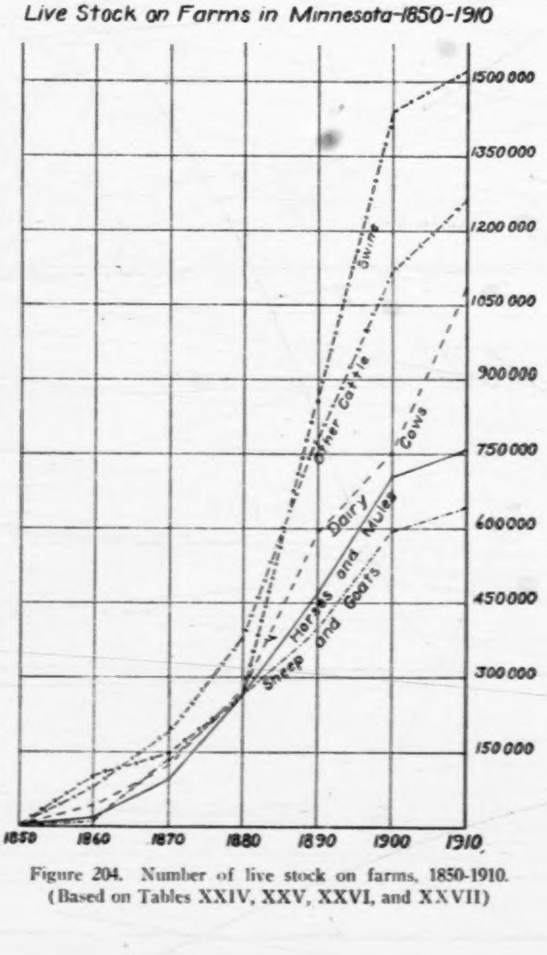


Figure 204. Number of live stock on farms, 1850-1910. (Based on Tables XXIV, XXV, XXVI, and XXVII)

increased 8.1 per cent, but mature horses 12.7 per cent. In spite of this increase, however, inquiry at the Midway horse market reveals the fact that too few horses are raised in the State to meet the demand of the lumber camps and the cities, many being imported, especially from Iowa.[50] The explanation is presumably the longer feeding season and the higher cost of feed compared to states farther south. Swine increased slightly (5.5 per cent) in spite of the youngest age class not being separated, which means a large gain in fact. The explanation is, of course, the development of the dairy industry. Sheep increased at the same rate (8.1 per cent) as horses; but ewes, which furnish a better test, increased 56.9 per cent. Goats were 20 per cent more numerous, without allowing for the change of date. Like sheep, they were being increasingly used in clearing cut-over lands. Poultry gained 31.4 per cent and bees 23.6 per cent during the decade, which indicates a considerable development of these by-product industries. The value of the younger age classes was usually less, by reason of the earlier date, which of course affected the relation of totals in 1900 and 1910.

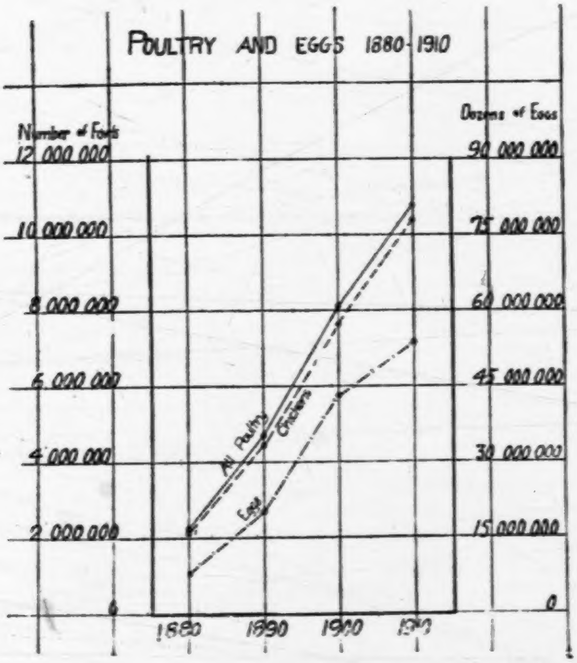


Figure 205. Poultry and eggs, 1880-1910. (Based on Tables XXVIII and XXXIII)

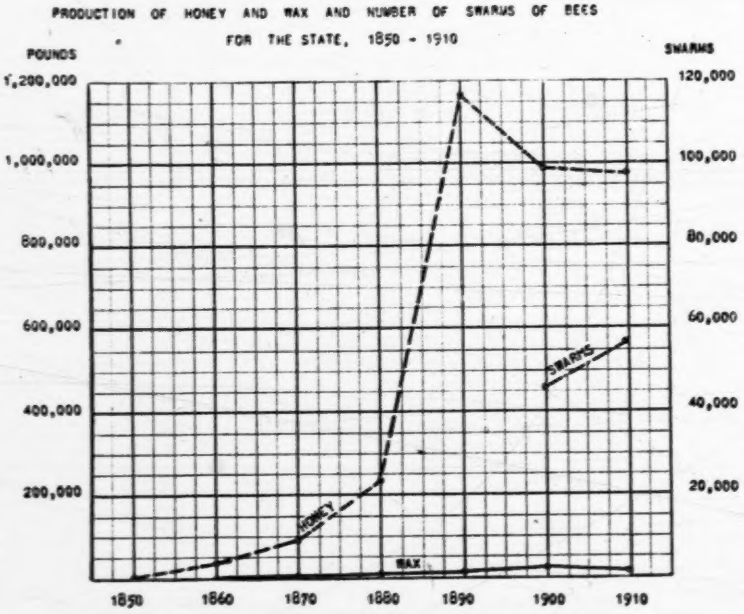


Figure 206. Bees, honey, and wax, 1850-1910. (Based on Tables XXIX and XXXIV)

All domestic animals except poultry and bees gained 14.3 per cent in number but 81 per cent in value, indicating an increase of two thirds in average estimated value. A part of this increase was, of course, due to the rise of the general level of prices; but a part of it, notably in the case of dairy cows and horses, may fairly be attributed to the introduction of blooded stock.

Changes in animal products, 1900-1910

Animal products increased faster than the number of domestic animals, exceeding also the increase of country population, except in the case of cheese and bee products. As with the value of animals, the value of their products showed a disproportionately rapid gain, due largely to better prices, but perhaps in part also to better quality. This relation is illustrated by the figures for wool, mohair, poultry products, animals sold and slaughtered, and receipts from dairy products (Items 322-372; Fig. 207).

The increase of output and of value is especially striking in the dairy industry. The total production of milk increased 34.6 per cent, while the value of dairy products to the farmers rose 84.3 per cent. The difference presumably represented increased prices, due in part to better quality. The milk sold declined from 103.8 to 53.2 million gallons, while the cream sold rose from 1.2 to 5.8 million gallons. This change followed the introduction of hand separators on the farms, which has occurred mostly since 1900.

The hand separator discouraged butter-making on the farm, because it enabled the farmer to shift this task to the factory without daily trips to the creamery. It also discouraged the sale of whole milk for either butter- or cheese-making. By the use of the separator the farmer was assured of fresh skim milk for feeding young stock; on the other hand, the skim milk received back from the creamery was usually sour, while the whey from the cheese factory (though estimated as worth in good condition 10 cents per hundred against 20 cents for skim milk)[51] was as a rule quite worthless, except perhaps in the Dodge-Goodhue district where the plan of pasteurizing it had come into use.[52] The net effect of these influences was: (1) to cause a rapid development of butter-making and at the same time to shift it more largely to the creameries; (2) to lower somewhat the grade of cream because farmers frequently kept it too long; and (3) to cause a decline in the cheese industry.

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[50] Letter from Barrett and Zimmerman, St. Paul, January, 1913.
[51] *Twelfth Report State Dairy and Food Dept.*, 1909. 133.
[52] *Thirteenth Report, State Dairy and Food Dept.*, 1911, 95; *Ninth Report*, 33

Whether this decline in cheese-making will continue may be doubted.[53] The rapid rise of Minnesota as a dairy state, from the eighteenth in rank in 1880 to the fourth in 1910, when only Wisconsin, New York, and Iowa had a larger value of dairy products, indicates exceptional advantages for the dairy industry. The same conclusion follows from the fact that up to 1912 Minnesota butter won eight out of the ten banners offered by the National Buttermakers' Association.[54] It is not clear why such advantages do not favor cheese as well as butter, especially in the hilly regions toward the north. Moreover, experience in both Wisconsin and Minnesota seems to show that butter equals cheese as a money-maker only in case its price is at least 2.5 times that of cheese,[55] and for some years past the price of butter has not maintained this ratio. The conclusion would seem to be that an expansion of cheese manufacture may be anticipated in the districts best adapted to it by nature or by reason of acquired skill. In this connection it is interesting to note that the 1913 report of the State Dairy Department shows an increase of approximately a million pounds (24.46 per cent) in the output of cheese for 1912 as compared to 1911. The value of materials increased even more rapidly, owing to higher prices.[56]

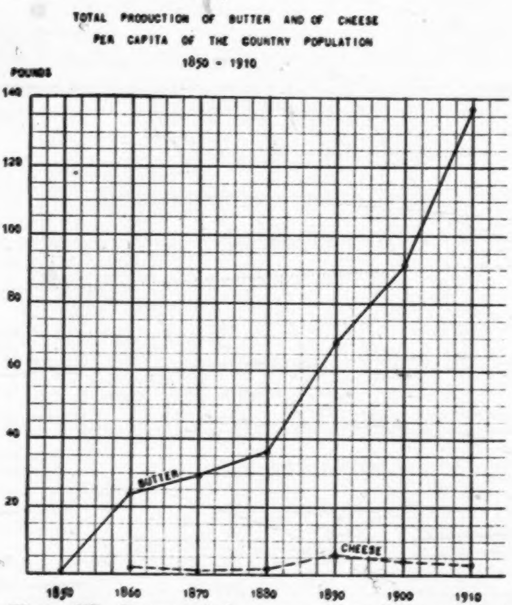

Figure 207. Butter and cheese per capita of country population, including both farm and factory product, 1850-1910.

Changes in values

The classification of the value of farm products in 1910 renders a comparison with the figures for 1900 uncertain, since no statement is given either of farm products fed to live stock or of total value of farm products. However, the total value of all farm products reported in 1900 was 161.2 million dollars, thus including 33.3 million fed to live stock and therefore counted twice. The extent of such duplication was 20.6 per cent. In 1910 the value of all crops, plus the returns from live stock (Items 386-388), amounted to 278 million dollars. If the extent of duplication was the same, we would obtain the following results:

TABLE 22

Items	1899	1909
Total farm products........................	$161,217,304	$278,052,215
Products not fed..............................	$127,959,824	$220,773,458

As a matter of fact, the increase of 112.6 per cent in value of animals sold, while largely due to higher prices and exceptionally heavy sales of meat animals that season, nevertheless indicates that animal husbandry was advancing faster than crop-raising, and consequently that more than 20.6 per cent of the total products was presumably fed to stock; but how much more there is no means of determining. All that can be said with certainty is that the value of farm products increased somewhat less than 72.5 per cent.

The expenditures for fertilizers decreased 70.2 per cent during the decade. It is evident that the farmers had begun to learn other methods of conserving the fertility of the soil without the use of commercial fertilizers, which can be used profitably only in the production of special crops of high value per acre. On the other hand, the expenditures for labor increased 34.1 per cent, probably as a result of larger numbers of live stock,[57] which require attention at all seasons. With expenditures decreasing or increasing less rapidly than the value of products, it would seem that the net returns to farmers must have risen materially faster than gross returns. The period 1900-1910 thus presents quite a different aspect from the preceding decade. In this connection attention may be called to the fact that country population was decreasing rather than increasing, except in the northern counties.

The value of tools and machinery, moreover, increased 73.9 per cent. This rate of increase slightly exceeded that of value of product, and was more than double the increase of labor, which would tend to diminish the unit cost of production. At the same time the increase in value of machinery was at approximately the same rate as the increase in value of products, and less than the increase in lands and buildings. This would seem to indicate that the machinery situation was in a fairly stable condition; in other words, that no revolution due to radically different types of machinery was in progress.

[53] *Fourteenth Report, State Dairy and Food Dept.*, 1913, 40.
[54] *Ibid.*, 1913, 35.
[55] *Annual Report, Commissioner of Statistics*, 1894, 85; *Wis. Agri. Exp. Sta. Bull.*, 60, 13.
[56] *Preliminary Report of State Dairy Dept.*, 1913, showed for 1911, 3,890,648 pounds, containing milk costing $397,056.58, for 1912, 4,842,328 pounds, containing milk costing $631,301.91.
[57] *University of Minnesota Studies in Economics No. 1*, 11.

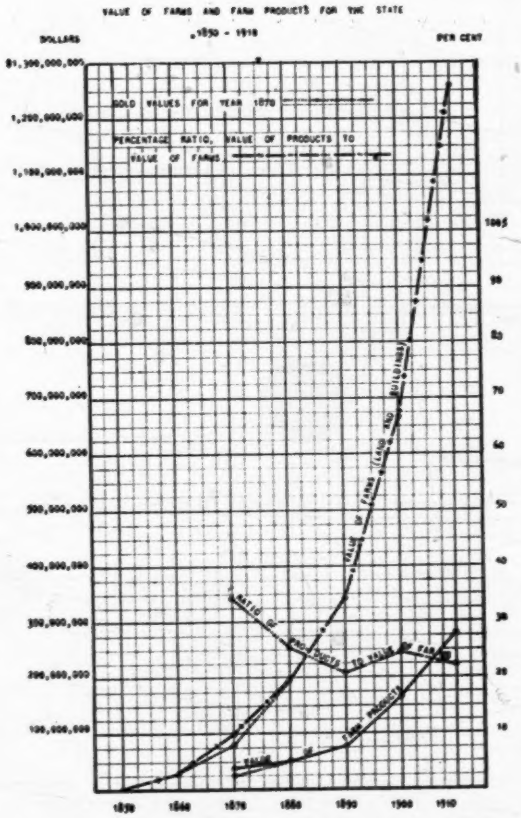

Figure 208. Value of farms (land and buildings), and value of farm products for the state as a whole, 1850-1910. (Based on Tables XXXV and XXXVI)

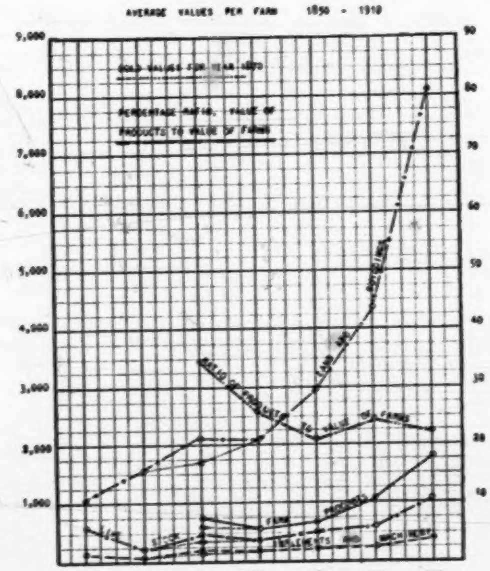

Figure 209. Average value of farm products and property per farm, 1850-1910.

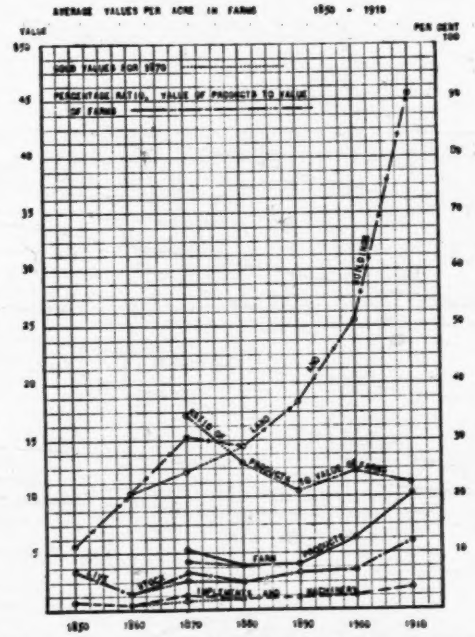

Figure 210. Average value of farm products and property per acre in farms, 1850-1910.

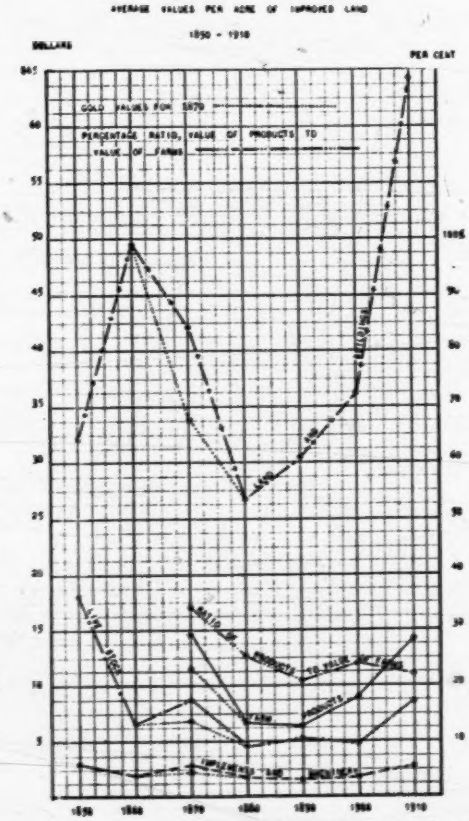

Figure 211. Average value of farm products and property per acre of improved land, 1850-1910.

The value of live stock on farms increased 81.5 per cent, farm land 82.2 per cent, farm buildings 120.8 per cent, land and buildings 88.6 per cent, and all farm property, real and personal, 87.2 per cent. The value of live stock thus outran value of farm products, again suggesting a more rapid growth of animal husbandry than of tillage. This large increase in buildings signifies, of course, a considerable investment of capital in fixed form, and is to be explained in part by the erection of good farm structures on the new lands in the northern part of the State, in part also by the increase of the dairy business.

The increased value of land reflected the gain of 2.9 per cent in wild, and 6.5 per cent in improved land included in farms, even though these additions were not in all cases productive during the census season. It may also be true, as has been claimed, that speculation or the example of other lands similarly situated but better farmed, resulted in pushing up land values over considerable sections faster than the returns from those particular lands warranted.[58] In the main, however, farm land is worth what it earns, capitalized at the current rate of interest. This means, of course, that a lower rate of interest would give a larger capital value; but the fact seems to be that interest rates in general rose rather than declined between 1900 and 1910. We are thus brought to the conclusion that the principal factor in this advance of land values was increased earning power, due to (1) greater technical efficiency, (2) more intensive farming shown by northward migration of dairy farming and corn growing, (3) higher prices for farm products, averaging perhaps 50 per cent advance (pages **209**, **212**), and (4) a higher ratio of net to gross earnings, due to the more rapid advance of returns than of expenditures for wages and fertilizers. Allowing for the extension of land area and this higher ratio of net to gross earnings, the increase of 82.2 per cent in land value corresponded substantially to the increase of 72.5 per cent in value of products.

Values in relation to land, 1850-1910

The relation of value of farms and value of farm products to each other at the several census years, so far as reported, is shown in Figs. 208, 219.

From Fig. 208, it is seen at a glance that the value of farm products for the State as a whole increased slowly from 1870, when first reported, up to 1890; but thereafter it rose rapidly, especially in the last decade. Value of farms, on the other hand, rose more rapidly with every decade from 1850 on, with the result that the actual increase in such value from 1900 to 1910 almost equalled the entire gain from 1850 to 1910. Throughout the period, with the single exception of the decade 1890-1900, value of farms increased faster than value of products, not only absolutely but relatively, so that value of products formed a declining percentage of value of farms. As previously indicated (page **136**) this fact seems to imply either an increasing ratio of net to gross farm earnings or a declining agricultural interest rate.

In order to eliminate from the calculations, so far as possible, the disturbing effect of new lands brought under cultivation Figs. 209 to 211 present the same data with reference to the farm, the acre in farms, and the acre of improved land in farms.

On the basis of the farm and of the acre of land in farms (Figs. 209, 210), the agricultural depression of the seventies stands clearly revealed, especially if currency values are used; and these were the only values which the farmers knew. It is, indeed, true that a large part of the great apparent prosperity during the sixties[59] had been fictitious, resting on nothing more solid than fiat money inflation; but this fact was not understood by the farmers, and, in any case, it did not render falling prices and stagnant land values any less disastrous for them. Moreover, from 1870 to 1880 there was a decline in value of farm products even on the gold basis. On the other hand, the decade 1880-1890 saw a recovery in value of products and an advance in value of lands. On the whole, however, the two decades 1870-1890 were clearly a period of acute agricultural depression in Minnesota as elsewhere, in striking contrast to the abounding prosperity of the two decades 1890-1910.

These contrasts between 1870-90 and 1890-1910 stand out still more clearly when the data are presented for each acre of improved farm land (Fig. 211). On this basis, however, it is seen that even during the sixties land values did not keep pace with the increase of improved land, continuing to fall until 1880; but that a rise then began in land values ten years before the advance in value of farm products in 1890. Changes in land values have thus anticipated rather than followed changes in value of products, much as values of stocks usually anticipate changes in dividend rates. On the basis of improved land, even more than on any other, the increase in all values during the last decade far outstripped any previous period or indeed all previous decades.

The new status of agriculture

Such a stupendous advance in farm values, due chiefly to higher prices for farm products, suggests that we have definitely entered upon a new era.[60] Ever since the discovery of America, the Old World has been exposed to an increasing stream of influences and of products from the New World. This reaction of America upon Europe has reached a maximum of intensity since about 1870, owing to the perfection of harvesting machinery, the use of Bessemer steel for steamships, locomotives, and rails, and the rapid extension of railways into the plains west of the Mississippi. Never in the history of man has so great an area of fertile land been brought under the plow and made accessible to the world's markets in so brief a time. As a result, Europe has been inundated by a flood of farm products, forcing prices down to levels never before reached. In fact, prices have for considerable periods of time gone below the cost of production in a large part of the United States. This condition, as previously noted, was an important cause of the Granger legislation and the insistent demand for "cheap money," represented by the greenback and free silver movements. In Europe the cheap foodstuffs from America caused a profound crisis in agriculture. Some countries, such as Denmark, were forced virtually to abandon grain-growing, while the area under grain was greatly diminished in most of Western Europe. This American competition, moreover, gave rise to the agrarian protection movement which has dominated the commercial policy of most European countries for the last thirty years.

On the other hand, the city populations both in America and in Europe have thriven and multiplied by reason of cheap foodstuffs. This has been the fundamental fact underlying the rush from the country to the cities. Never before have so many people lived in the cities or lived so well as during the last half century. Economic doctrine, too, has been profoundly affected by the fact of cheap foodstuffs. It has a close relation to the modern neglect of production in favor of theories pertaining to distribution. So far, however, as our thinking has presupposed an indefinite continuance of cheap foodstuffs, we have all been living in a fool's paradise. The Columbian age, the age of plenty produced by opening up and exploiting the colossal riches of a new continent, is drawing to a close. This fact is clearly apparent in the rising prices of farm products and of farm lands as reported by the census of 1910, not only in Minnesota but in the country at large. This same conclusion is even more strikingly confirmed by the beginning, during 1913, of food imports into the United States on a considerable scale. The underlying fact is that the population, both of this country and of the world at large, has of late increased much faster than the area brought under the plow; much faster than the intensity of cultivation on lands already cultivated; and much faster than the total crop of foodstuffs. Moreover, no second Mississippi Valley remains to be exploited. Most of Australia is arid and much of Canada and Siberia is frigid; and the lands that remain to be put under cultivation in Asia, in Canada, and in Argentina have not the economical potentialities of those that have been brought under tillage in the last fifty years.

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[58] *Minn. Agri. Exp. Sta. Bul. 117*, 48-50.

[59] Ruggles, Clyde O., *The Economic Basis of the Greenback Movement in Iowa and Wisconsin* (*Proc. Miss. Valley Hist. Assn.*)

[60] From the author's *Changes in Minnesota Agriculture Indicated by the Preliminary Results of the Thirteenth Census* (*Quart. Pub. of Am. Statistical Assoc.*, March, 1911).

During all this age of plenty, the farmer alone has usually been oppressed with poverty, since for him it has meant low prices for his products. These conditions have given rise to our current American conception of the farmer as a hard-working and underpaid member of society, at the mercy of all other classes. For the future, however it may be with the farm laborer and the tenant farmer, the land-owning farmer must be reckoned a capitalist who is certain to receive year by year an increasing share of the social dividend.

In view of these facts, it becomes of great importance to ascertain what are the present tendencies as to number of farmers, as well as the size and tenure of farms.

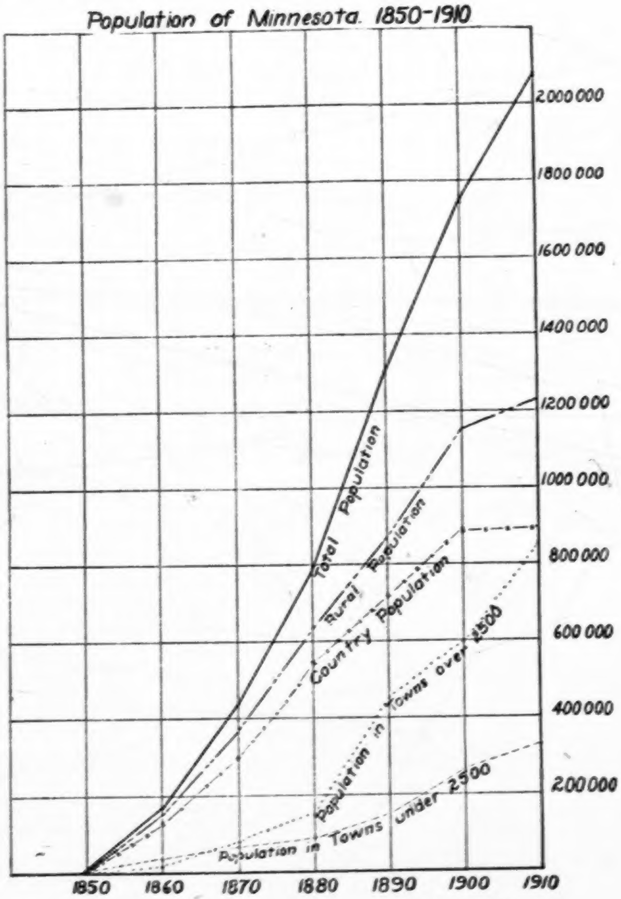

Figure 212. Absolute increase of population, 1850-1910. (Based on Table XI)

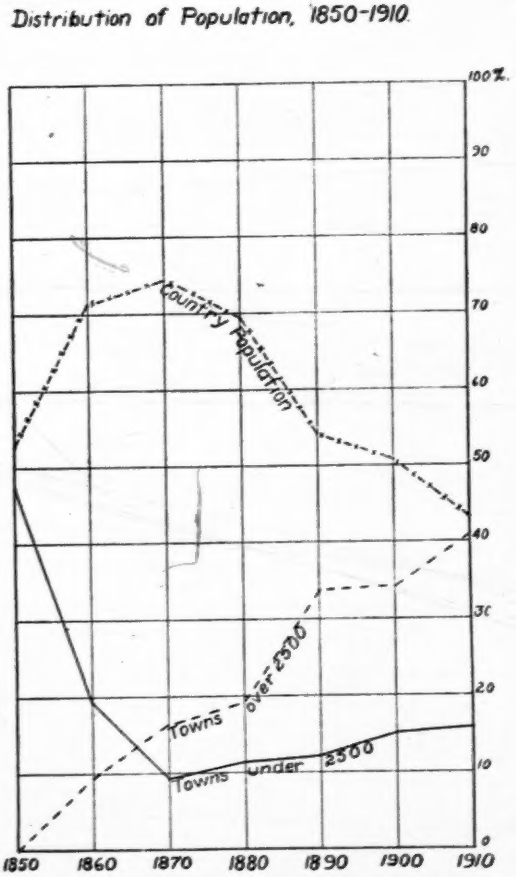

Figure 213. Relative increase of country and town population, 1850-1910. (Based on Table XI)

Changes in country population

From 1900 to 1910 there was an increase of 8,298 persons in the open country, against 316,016 or 36.7 per cent in incorporated places; the total for the State being 324,414 or 18.5 per cent. The total and the relative increase of population in the country, in places under 2,500 inhabitants and in larger municipalities is shown in Figs. 212, 213, for each census interval.

From Figs. 212, 213, it is evident that country population gained very rapidly up to 1880, and at a less rapid rate up to 1900, since which date it has been practically stationary. Villages under 2,500 population increased most rapidly from 1880 to 1900, though continuing to increase somewhat from 1900 to 1910. Cities of over 2,500 population, on the other hand, began to grow most rapidly in 1880, when the first slackening of country population appeared and after a slight check, due presumably to the panic of 1893, resumed substantially their rapid increase from 1900 to 1910. At the rate there shown, it seems probable that by 1915 more people will be found in municipalities of 2,500 or more inhabitants, than in the open country. On the percentage basis (Fig. 213), the year 1870 marked the highest point for country, and the lowest for village, population; while on the other hand 1910 marked the lowest for country and the highest for cities of over 2,500 inhabitants.

As previously indicated this check to country population resulted from an actual decline in southern and central Minnesota, which all but wiped out the increase in the northern section (Figs. 197, 198). The question is, what caused this decline in the country, throughout nearly all the richest farming counties of the State?

It is evident that a decline in population must mean either fewer members in each country household; or fewer households; or both these conditions combined. The latter is believed to be the true explanation in most of the counties concerned.

A decrease in the number in each household may be due either to fewer hired help, or to fewer children at home; and here again both causes are believed to be operative.

For one thing, less help has been needed of late in general farming because of the general use of nearly automatic machinery for much work formerly performed by hand. Another change tending in the same direction is the transfer of butter- and cheese-making to factories, together with the introduction of separators on the farm, which has reduced the frequency of trips to the factories. On the other hand, the change from grain to live stock has made the demand for labor more continuous, if less extensive at certain seasons; migratory labor can not be depended on, especially since the lumber industry is largely a thing of the past; and immigration of northern Europeans, familiar with the care of live stock, has greatly diminished. It is even claimed that farmers, discouraged by inability to get efficient help, have sometimes leased their farms,[61] as cotton planters have done in the South, on the theory that a tenant will show more interest and capacity than a hired laborer.

A reduction in the average number per household could also occur through a higher death-rate, a lower birth-rate, or the migration to the cities either of individuals or of large families. The death-rate certainly has not risen, though reliable statistics are not available as to its actual course for the country population. The birth-rate, on the other hand, has declined, at least in some of the older rural districts, from 41.5 per thousand in 1860 to 14.7 for a recent five-year period.[62] This decline of nearly two thirds in the birth-rate would alone suffice, if general, to explain the decrease of country population. That it is at least wide spread is shown by the fact that in one school district after another where formerly there were 25 to 35 children, there are now only 5 to 10. Families now number 3 or 4 in place of 8 to 10. On the other hand, in communities where people of a single nationality and tongue are compactly settled, especially in the newer parts of the State, families of 8 to 10 children are still common. These facts suggest that the decrease of the birth-rate is due in the main to the spread of education and a higher standard of living, which everywhere tend to check child-bearing. Moreover, before the days of farm machinery, children were more useful and could begin to pay their way at an earlier age. This is true on the whole in spite of an occasional task which a child can perform with machinery. It follows that just as laws raising the age of employment have been followed by a decline of the birth-rate among factory populations, so the introduction of machinery has tended to discourage large families on the farm, by postponing the period when the children could become economically useful.

Further, not only has the birth-rate fallen, but for the same reasons the current of migration to the cities has gathered force. Thus, in a typical southern Minnesota township 60 per cent of the girls and 37 per cent of the boys between 16 and 21 years of age were away from home, either studying, teaching, or working in the cities; while of those over 21 years, who had presumably chosen their calling, 53 per cent of the girls and 22 per cent of the boys were not on farms.[63] The larger proportion of women who abandoned the farm is obviously due to the fact that not being generally employed in fields in this country, fewer women than men are needed in modern farming, especially since butter- and cheese-making and, to some extent, canning have become factory industries. The farm household was in former generations an important center of production, as well as of consumption; but having been stripped of industries, with the exception of cooking and sewing, the labor force thus released has naturally sought employment in the towns where most of the former household industries are now carried on.

Among well-to-do farmers this migratory movement frequently takes another form. Instead of the children going singly to seek education or employment, they prevail upon the parents to move to town, the farm being left to the oldest son or a son-in-law, or to some other young man as tenant. On the average this form of migration also results in a net loss of country population, while the country towns and, to some extent, the cities are continually recruited from such retired farmers.

Population in relation to size of farms

The country also lost population, not only by a decrease in the size of the average household, but also by a decrease in the number of households. This fact appears clearly in the decreasing number and increasing size of farms in most counties (Figs. 214, 215).

These changes do not mean abandoned farms, in the usual sense, but merely abandoned farmsteads, which are a familiar sight in some parts of the State,[64] notably in the Red River Valley. This tendency toward fewer and larger farms, while general, was not at all universal. Thus, in the southern part, Steele County, in the heart of the dairy section, showed a slight increase in number of farms, with a corresponding decrease in size. This is the more difficult to explain since the average farm in Steele was already smaller than in most of its neighbors, and other dairy counties such as Freeborn and Goodhue changed in the oppo-

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[61] *University of Minnesota Studies in Economics, No. 1*, 5, 71.
[62] *Ibid.*, 3.
[63] *Ibid.*, 68, 74-75.
[64] Works, S. D., in *Proceedings of Minnesota Agricultural Society*, 1911, 283.

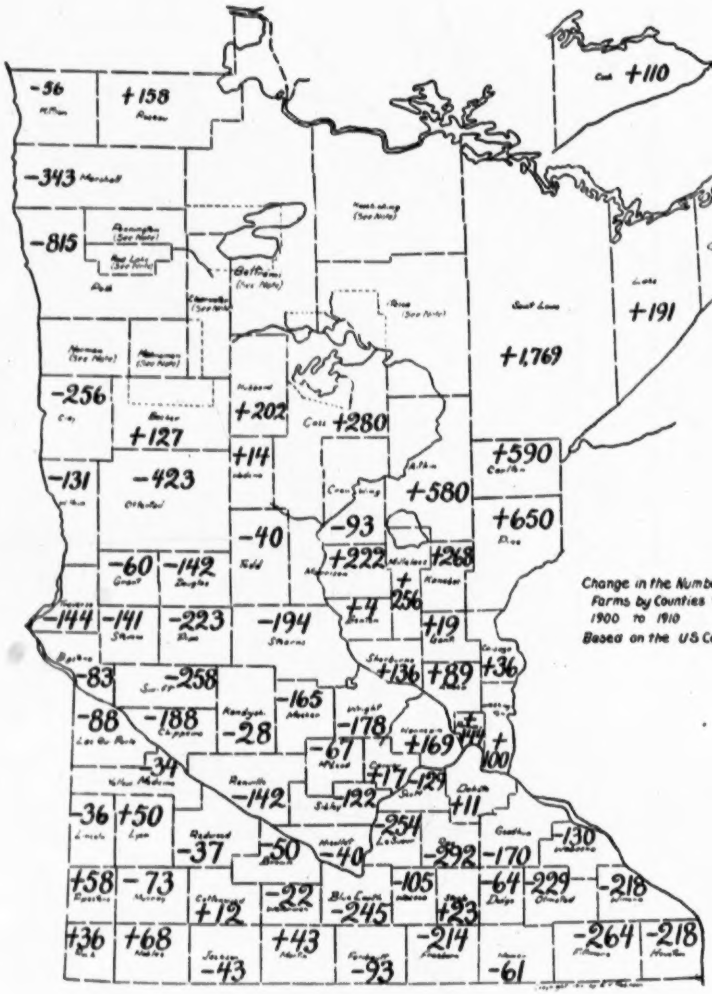
Change in the Number of Farms by Counties from 1900 to 1910 Based on the US Census

Figure 214. Change in number of farms by counties, 1900-1910.[66] (Based on Table XII)

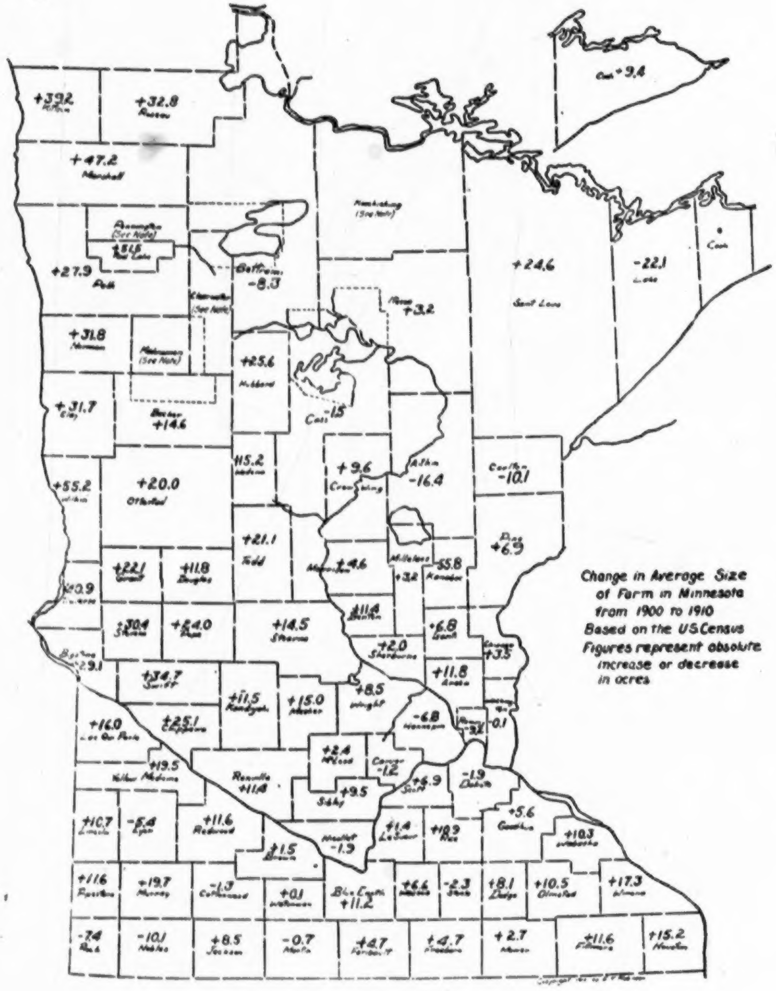
Change in Average Size of Farm in Minnesota from 1900 to 1910 Based on the US Census Figures represent absolute increase or decrease in acres

Figure 215. Change in average size of farms by counties, 1900-1910.[66] (Based on Table XXXVI)

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[66] Counties left blank were organized or changed as to boundaries after 1900.

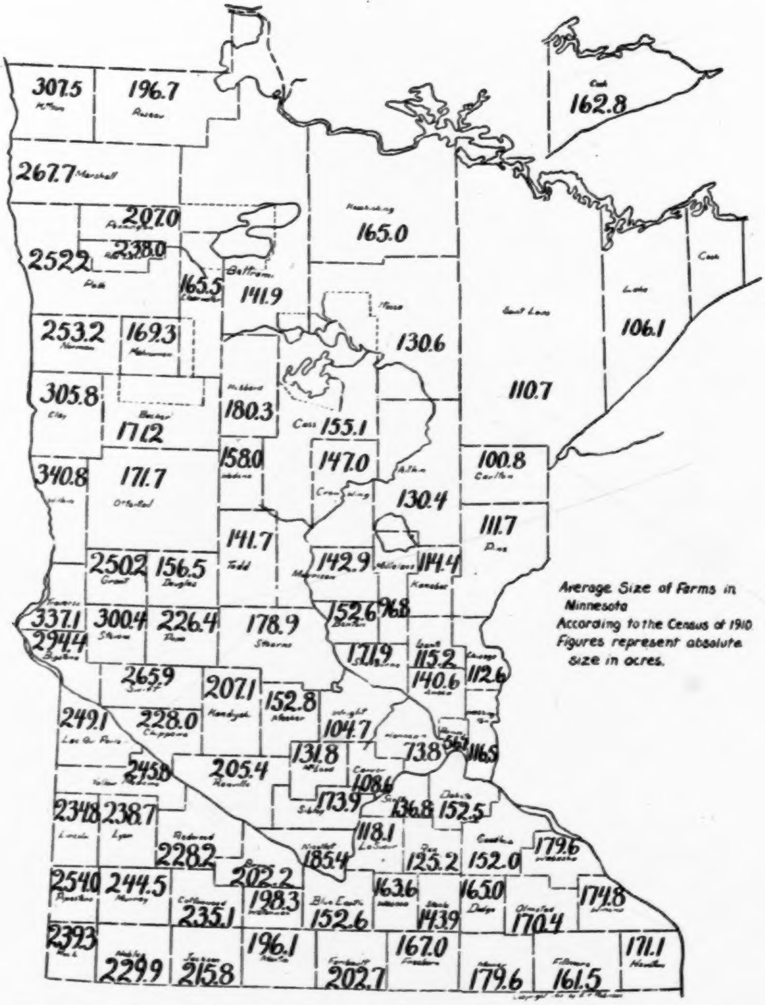

307.5
196.7
162.8
267.7
207.0
165.0
238.0
252.2
165.5
141.9
253.2
169.3
130.6
106.1
305.8
110.7
180.3
171.2
155.1
340.8
171.7
158.0
147.0
100.8
130.4
141.7
111.7
250.2
156.5
142.9
114.4
337.1
300.4
226.4
178.9
152.6
96.8
294.4
171.9
115.2
140.6
112.6
265.9
207.1
152.8
249.1
228.0
104.7
131.8
73.8
56.7
116.5
245.0
205.4
108.6
234.8
238.7
173.9
136.8
152.5
118.1
179.6
228.2
185.4
125.2
152.0
202.2
254.0
244.5
163.6
165.0
174.8
198.3
235.1
152.6
143.9
170.4
239.3
196.1
167.0
171.1
229.9
215.8
202.7
179.6
161.5
Average Size of Farms in Minnesota
According to the Census of 1910
Figures represent absolute size in acres.

Figure 216. Average size of farms by counties in 1910. (Based on Table XXXVI)

site direction (Figs. 215, 216). Southwest of the Minnesota River, where the farms averaged from 40 to 80 acres larger than in the southeast, two contradictory tendencies were also manifest. Along the crest of the Coteau des Prairies, the number of farms fell off while the average size increased; but on both slopes of this ridge, farms increased in number and decreased in size. In this class were several counties, notably Martin and Rock, which grew heavy crops of corn, and one is tempted to infer that corn-growing tends to smaller farms. This inference cannot, however, be maintained in face of the sharp drop in number of farms in Fillmore and other important corn counties. In the rest of the State, however, these conflicting tendencies were not greatly in evidence. The western and northwestern section, north of the Minnesota, showed a general decline in number and increase in size of farms. This, it will be remembered, was still the home of small-grain-farming. On the other hand, all the counties adjacent to the Twin Cities had a larger number of farms owing to the increase of vegetable- and fruit-growing; and the same condition obtained in the northeastern forest zone, where additional land was coming under cultivation. In a general way, the region of fewer farms corresponded unmistakably with the region of decreasing country population (Figs. 215, 198).

Type of farming in relation to size of farm

As a result of the changes which took place in previous decades, as well as from 1900 to 1910, the average size of farm at the latter date varied from 56.7 acres in Ramsey County to 304.8 acres in Wilkin, the general acreage for the State being 177.3 acres of all land including 125.8 acres of improved land.

Excluding Ramsey and Hennepin, where market-gardening reduced the average, no county averaged less than 100 acres per farm. Aside from the counties adjacent to the Twin Cities, the smallest average was found in the forested district of the northeast, and the next smallest in the southeast. On the other hand, the largest average size was in the northwest and the next largest in the prairie district of the southwest.

More significant than changes in average size were the changes by classes (Table 23).

TABLE 23.—CHANGES IN SIZE OF FARMS BY CLASSES ACCORDING TO THE CENSUS OF 1910

Classes of farms	Number of farms		Increase or decrease (a minus sign denotes decrease)		Percentage of total	
	1900	1910	Number	Percentage	1900	1910
Under 20 acres	4,803	5,619	816	17.0	3.1	3.6
20 to 49 acres	13,278	12,028	—1,250	—9.4	8.6	7.7
50 to 99 acres	30,990	26,571	—4,419	—14.3	20.0	17.0
100 to 174 acres	56,785	55,424	—1,361	—2.4	36.7	35.5
175 to 499 acres	45,473	52,836	7,363	16.2	29.4	33.8
500 to 999 acres	2,965	3,359	394	13.3	1.9	2.2
1,000 acres and over	365	300	—65	—17.8	.2	.2

It is clear, from an examination of the percentage column, that there has been a marked decline in the number of small general farms (between 20 and 175 acres), and also in the number of large farms (over 1,000 acres). On the other hand, there was a notable increase in the class of farms under 20 acres, devoted to fruit, market-gardening, and the like; and an even greater increase in the classes of large general farms (between 175 and 1,000 acres), which has raised the average farm in Minnesota from 169.7 acres in 1900 to 177.3 acres in 1910. The conclusion is irresistible that there is in progress an adjustment of the size of farms to the types of farming.

Such an adjustment is a step toward more economical and effective farming; and this is equally true, whether it is attained by enlarging or diminishing the size of farm. It is a vicious popular error, propagated by various sentimental writers, to suppose that a smaller farm always means better farming. That depends absolutely upon the crops grown, the amount of hand-work involved in their production, the progress of invention as to labor-saving machinery, the relative cost of labor and capital goods measured by their output, the value of the output per acre multiplied by the number of acres which can be handled by a unit equipment of labor and capital, and the proportion in which management must be combined with the other factors to give maximum returns; in brief, it depends upon the type of farming. Thus, the size of farm which is best for vegetable-gardening would be absurd for wheat-growing; yet we need bread no less than vegetables, and it is to the interest of all, consumer and producer alike, that wheat be grown by the most efficient combination of land, labor, and capital. Again, an intertilled crop, such as corn, presents quite a different problem from the small grains; a hand-thinned crop, such as sugar beets, has another set of requirements; and the various branches of the animal industry, such as dairying, introduce still other problems which affect the proportion of land to labor and capital. There is, consequently, no one size of farm best suited to all types of farming; nor can the best size for any given type be ascertained except by experiment. Moreover, the best size to-day may not be the best to-morrow, since it varies with the invention of new machinery and with any other change which affects the relative cost of labor and capital goods. In the case of Minnesota, for example, the average farm, based on the homestead unit, has long been too small for the most economical operation in small grains, owing to the introduction of highly efficient machinery for such crops; and it seems possible that the Babcock test, the mechanical separator, and the use of factory methods generally in the dairy industry have tended likewise to enlarge the dairy farm as shown by the decreasing number and increasing size of farms in most of the dairy counties; though it is still true that dairy farms average much smaller than grain farms (Figs. 214, 215).

In view of these facts, it is unfortunate that the census did not make at least three divisions between 175 and 500 acres, and a corresponding number between 500 and 1,000 acres. This would permit a closer delimitation of the size of farms with reference to the principal types of farming. It would likewise show which types tend to large and which to small farms, and thus enable us in a measure to forecast the future of American agriculture.

Conflict of interests

City people generally view with favor every reduction in the size of farms and every increase in country population, irrespective of the type of farming, assuming that smaller farms and a denser farming population mean in general an increase in the aggregate output of farm products. On the other hand, the tendency toward larger farms and a smaller farming population, which has appeared in much of the north central section, usually arouses great uneasiness. In this matter inhabitants of the cities instinctively take the viewpoint of their class interests, since it is true, on the whole, that the denser the agricultural population and the larger the aggregate crops, the more business there will be for townspeople of every sort, from the village blacksmith and carpenter to the metropolitan merchant and banker.

On the other hand, how does the matter stand with the farmer himself? It sometimes seems to be forgotten in this connection that the farmer, like other classes of the community, is not purely a philanthropist, nor yet interested primarily in making a good statistical showing for the State, but rather in securing the best living for himself and his family. Moreover, the largest returns to the farmer are not usually identical with the largest aggregate crops. Not to speak of variations in the prices of farm products, which sometimes cause lean crop years to be the more profitable to the farmer, it is true in general that the attempt to wring larger and larger yields of the same kind of crop from the same area of land, using the same technique, necessarily encounters the law of (relatively) diminishing returns, or increasing expense per unit of product. Thus, if L = a given number of acres of a certain quality of land, W = a number of days' labor with the proper tools and machinery, P = the number of bushels so produced, and A = an additional number of days' labor, then

$$L+W = P;\ \text{but}\ L + A\,W = A\,P\,—.$$

This equation necessarily holds true after the stage of frontier agriculture is passed, when the ground was sometimes scratched so superficially as virtually to yield no crop at all.

All commodities are the joint product of land, labor, and capital in the form of tools, machinery, live stock, etc.; and it is impossible, in the nature of the case, to increase a joint product proportionally to the increase in any one or two factors, while the other factor remains unchanged. This fact, while possibly obscure to unreflecting persons of other occupations, is well known to every plowboy in Minnesota; for if it were not, there would be no reason why any farmer should buy or clear more land. In fact, except for this principle of (relatively) decreasing returns and increasing cost per unit of product with greater intensity of cultivation, a farmer could raise as much wheat on a single acre as on 1,000 acres, and as much on a square yard as on an acre; not only so, but he could clear as much over cost of production on the smaller as the larger area.

In view of this fact it is obvious that the farmer has no interest in expending more labor on less land, unless some product can be found which will yield, not only a larger gross return but also a larger net return per acre; not only so, but a net return so much larger that the profit per acre multiplied by the number of acres which one man can handle will exceed the aggregate profit possible with his previous type of farming. Thus, if one man can raise 100 acres of corn or 10 acres of sugar beets, yielding (let us say) $5 net per acre of corn or $50 net per acre of beets, there would be neither gain nor loss in changing from corn to beets, so far as concerns the returns to his labor. On the other hand, if the beets yielded only $25 per acre above expenses, the man would evidently earn better wages growing corn. The mere fact that one crop yields more per acre than another is therefore not at all conclusive as to which is the more profitable to the farmer. It follows that except for certain highly intensive crops, commanding but a limited market, such as vegetables and fruit, the system of very small farms which finds many advocates in the cities would mean, not only a higher cost of production per unit of output, but also a lower standard of living on the part of the farmers. In a word, it means the development in this country of the ignorant and narrow-minded peasant type represented by the famous picture of "The Man With the Hoe"; a type due less to oppression by kings and nobles, which Markham's poem naively assumed to be the cause, than to the very "hoe" from which the picture is named—that is, to generations of monotonous and exhausting hand labor, devoid of intelligence and of interest, on farms too small to permit the use of machinery.

On the other hand, the farmers in Minnesota who are enlarging their farms and machinery equipment are presumably moving in the direction of larger profits and a better living for themselves and their families, even though this may mean less labor on each acre, a smaller country population, and less business for the townspeople. Certainly the increase of the average farm up to the size giving maximum efficiency would offer an incentive for managerial ability to remain in the country, and, by raising the standard of living on the farm, would also tend to increase the attractions of country life.

The foregoing discussion, it should be noted, concerns greater intensity of cultivation with the same technique. In so far as new and better varieties of crops and stock, or more scientific methods of cultivation, are discovered and introduced, this conflict of interests between classes is fortunately suspended; since larger yields at less cost per unit are to the advantage both of city and country. Scientific agriculture rather than mere intensification of cultivation by the use of more labor of the same sort is consequently the road to social peace and general prosperity, whether it leads to smaller or to larger farms, and to a larger or a smaller country population. It is on this account that schools and colleges of agriculture as well as the agricultural experiment stations, are of such immense social, as well as economic, importance.

Relation of country population to land and values, 1850-1910

In order to see what has actually happened, decade by decade, and the relation of each to the following, summary charts are here presented concerning the period 1850-1910 so far as the data were collected by the census.

From Fig. 217 it is evident that the average size of farms declined from 1850 to 1870, since which time there has been a steady increase. At the same time, the proportion of improved land has continually mounted, the most rapid gain being from 1870 to 1880, and the least from 1900 to 1910. Stated in terms of population (Fig. 218), this means that there has been an increasing number of acres of improved land per capita of the country population in every decade; and so also of tilled land, except for the period 1900 to 1910, when considerable plow land was seeded down to pasture. In place of applying more labor to less land, the farmers of Minnesota are thus using more land with the same, or less, labor.

The financial results of this plan, from the viewpoint of the farmer, appear in Fig. 219. For the period 1870-1890, this diagram, like those based on land, shows a stagnant or declining value of products per capita and only a moderate increase in value of farms; but for the period 1890-1910, evidence again appears of abounding prosperity. What would have happened to the individual farmer if, with the same scientific knowledge and technique, there had been during these years a decreasing acreage of improved land per capita of the country population, is not difficult to conjecture. Certainly in such circumstances the dark period 1870-1890 would have created among us many a "man with a hoe" whom not even the prosperity following 1890 could have redeemed.

Farm tenure and indebtedness

In the matter of land tenure there were also some significant developments. Farms operated by full owners declined from 72.4 to 63.7 per cent from 1900 to 1910, while those operated by part owners increased from 9.6 to 14.5 per cent of all farms (Table 24, Items 390-393). Combining the two classes, it appears that farms operated by full or part owners declined from 82 to 78.2 per cent of all farms. On the other hand, farms operated by tenants increased from 17.3 to 21 per cent, and those operated by salaried managers, from 0.7 to 0.8 per cent of the total number of farms. These changes may be due in part to the fact previously noted that a number of "bonanza" farms of over 1,000 acres have been broken up and leased to tenants, who are presumably, in many cases, on the way to buy the lands they now occupy. The decline in owners, especially full owners, is, however, too con-

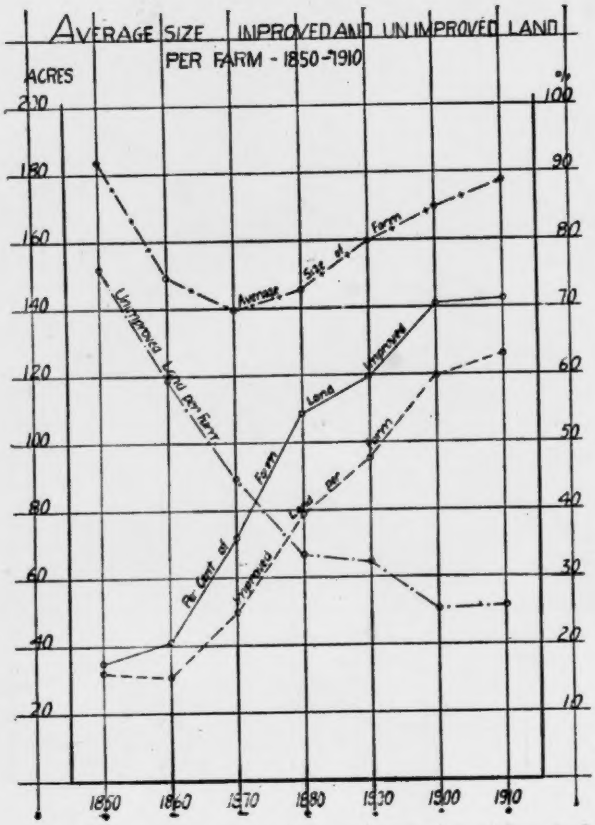


Figure 217. Average size of farms and proportion of farm land improved. 1850-1910. (See Table XXXVI)

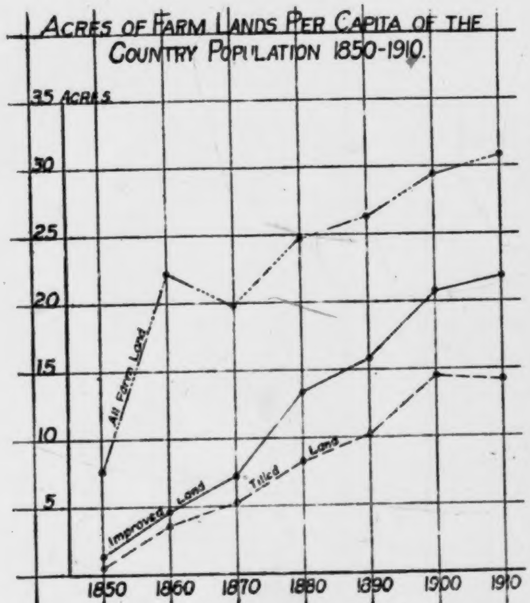
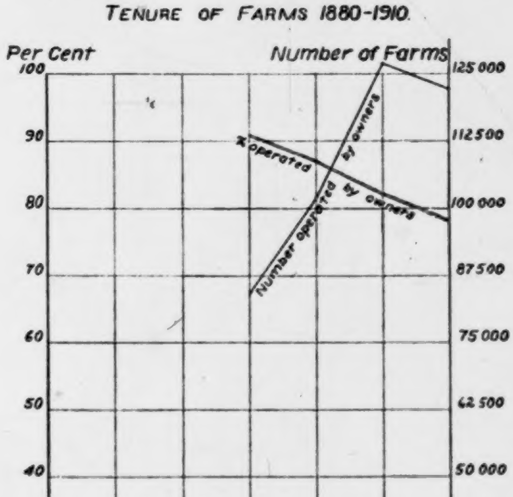


Figure 218. Acres of farm land per capita of the country population, 1850-1910*

*Land in farms and improved land as reported in the U. S. Census. Tilled area from following sources:
For 1850 and 1860, *Statistics of Minn.*, 1869, 5.
For 1870, *Ibid.*, 1872, 9.
For 1880 to 1910. Calculated by adding all reported acreages of individual crops from the U. S. Census, and in case of 1880 and 1890 supplementing from *Statistics of Minnesota* for all crops for which the census gave no acreage.



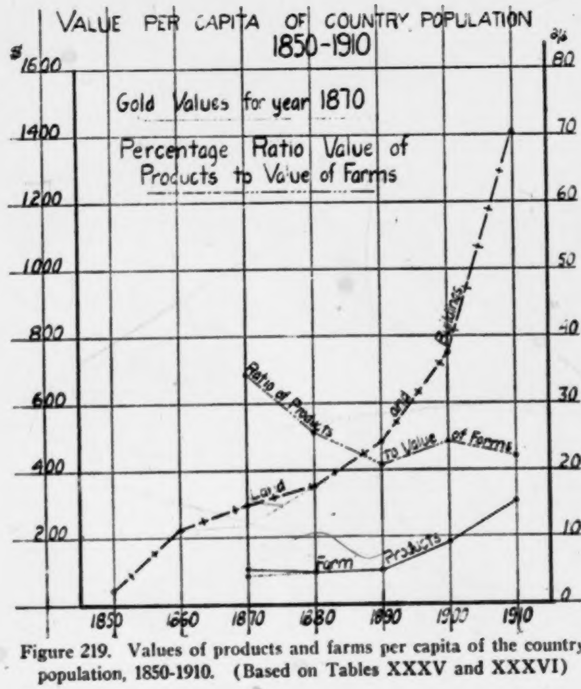


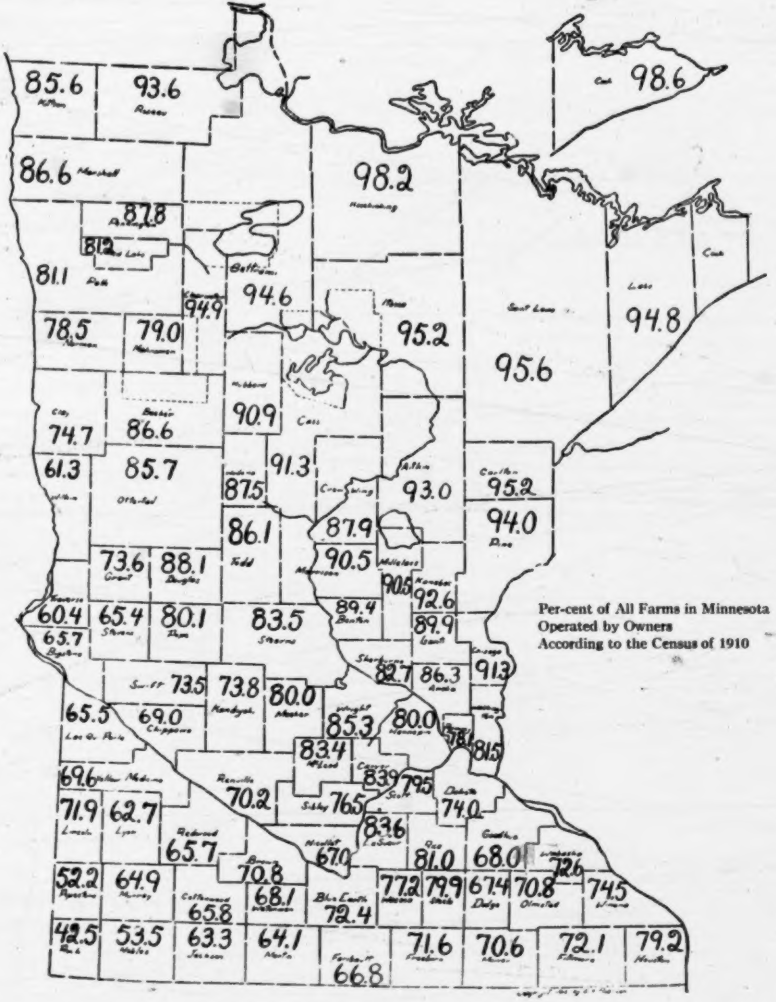
Figure 219. Values of products and farms per capita of the country population, 1850-1910. (Based on Tables XXXV and XXXVI)

Figure 220. Tenure of Farms, 1880-1910.

siderable to be explained solely or even mainly on this ground. The increase in farms operated by managers probably testifies to the influence of the colleges of agriculture, which are turning out young men well trained for such positions.

The relation of these changes to conditions during previous decades has already been shown in Fig. 220. From this it appears that the percentage of farms operated by owners has declined steadily, and almost uniformly, from 1880, when the first report was made on tenure, to 1910. Moreover, the absolute number of farms operated by owners, after increasing rapidly from 1880 to 1900, also began to decrease thereafter. On the whole it is impossible to avoid the conclusion that some fundamental forces have been at work tending to supplant landowning farmers with tenant farmers.

Some clue as to the nature of these forces may be found by observing how the several classes of farms were distributed over the State (Fig. 221).


85.6
93.6
98.6
86.6
98.2
87.8
81.2
81.1
94.9
94.6
94.8
78.5
79.0
95.2
95.6
90.9
74.7
86.6
61.3
85.7
87.5
91.3
95.2
93.0
86.1
87.9
94.0
73.6
88.1
90.5
90.5
92.6
60.4
65.4
80.1
83.5
89.4
89.9
65.7
82.7
86.3
91.3
73.5
73.8
80.0
65.5
69.0
85.3
80.0
81.5
83.4
69.6
83.9
79.5
71.9
62.7
70.2
76.5
74.0
83.6
65.7
67.0
81.0
68.0
72.6
52.2
64.9
70.8
77.2
79.9
67.4
70.8
74.5
65.8
68.1
72.4
42.5
53.5
63.3
64.1
71.6
70.6
72.1
79.2
66.8

Per-cent of All Farms in Minnesota
Operated by Owners
According to the Census of 1910

Figure 221. Percentage of farms operated by owners in 1910.
(Based on Table XXXVI)

A glance at this map shows that the percentage of landowning farmers varies from 98.6 in Cook to 42.5 in Rock County, being on the whole greatest in the newest parts of the State, where land is cheapest, and least in the oldest sections, where land is dearest. There is also evident a variation with the type of farming and the size of the farm. Thus, the southeastern counties, where the farms are smaller and devoted chiefly to dairying, have a materially larger proportion of farms operated by owners than the southwestern counties. A dairy herd evidently needs the care of the owner, and, owing to the large capital required, dairy herds can seldom be supplied by tenants. Again, the counties immediately around the Twin Cities, where farms average smaller, and more intensive use of the soil prevails, show a higher proportion of landowning farmers than counties farther west.

In fact, the eastern half of the State, originally wooded and now devoted to dairying and mixed farming, has been conspicuously less invaded by tenancy than the western grain-growing section.

These inferences as to the relation of value of land and size of farm to tenancy are confirmed by comparing farms operated by owners and by tenants. Thus, the average farm operated by full or part owner in 1910 contained 169.3 acres, an increase since 1900 of 4.5 acres or 2.7 per cent; and was worth $44.53 per acre, an increase since 1900 of $19.64 or 78.9 per cent. On the other hand, farms operated by tenants contained on the average 200.9 acres worth $48.71 per acre, and farms operated by managers averaged 338.6 acres, worth $50.54 per acre. The value of farms in 1910 thus averaged $7,538 per farm for owners, $9,789 for tenants, and $17,111 for managers. Evidently, the larger the farm and the greater the value per acre, the more difficult it is for tenants to buy, and, therefore, the greater is the proportion who fail to become landowners, in case the original owners abandon farming (Table 24, Items 389-436).

Conflicting influences are thus set in motion by the increasing size of farms. On the one hand, it renders farming more attractive for landowning farmers. On the other hand, it renders tenancy more surely permanent; and it is a well established fact that tenants on the average take less part in farmers' coöperative movements and show less interest in community projects than resident landowners.

The figures for farm indebtedness show that mortgaged farms increased from 44.8 to 46.3 per cent of the total, mortgaged and unmortgaged. Owing to the defective character of the report on indebtedness in 1900, it is not possible to make a comparison on other points. This is, however, possible for 1890 (Table 24, Items 443-449). For the twenty-year period 1890-1910 the number of farms mortgaged declined 9.9 per cent and the ratio of debt to value of farms declined from 31.6 to 26.4, or 16.5 per cent, while the average equity of the owner per farm increased from $1,760 to $5,198, or 195.3 per cent. The great increase of land values was thus enriching the man who held the title, even though he had failed to remove the mortgage. On the other hand, this same increase of value was building a constantly higher barrier between tenancy and landownership.

As conditions are in this country, whatever hinders the purchase of farms by tenants works for a permanent and ever-increasing system of land tenancy. In various ways landownership gravitates toward the cities. For one thing, the migration of young people to the cities causes many farms to pass by inheritance to urban residents, who rarely return to the country to work their farms. Again, other farms are purchased by business or professional men for investment or speculative purposes. Still others, and these the larger number, are given over to tenants when the owners retire to the cities to spend their later years. In some cases, indeed, these farms are left in charge of a son or son-in-law who will presumably become the owner; but in a typical township this was true in only 13 per cent of the cases.[66] For the most part the movement of landowning farmers to towns and cities means the permanent increase of tenancy, except in so far as tenants alien to the family are able to purchase the land. This movement city-ward also tends to deprive the country of its natural leaders in all plans, public and private, for the betterment of rural life.

To check the increase of tenancy from these causes, two courses are open: either to facilitate purchase by tenants, in spite of the increasing size and value of farms in this section of the country, or to lessen the migration of landowning farmers to the cities. In order to facilitate purchase, the most promising plan would appear to be the provision of capital at lower interest rates through the improvement of rural credit facilities; provided some method can be devised of preventing town investors and speculators from taking advantage of such lower rates to buy up still more farm land. Obviously this is a difficult task, though perhaps not insuperable. In order to check the migration of farmers to the cities, country life must be made more attractive. This is largely, though by no means exclusively, a matter of education.

Certainly the problem presented by the steady increase of farm tenancy is one not only of economic interest and importance but of great social and political significance as well. American democracy in the past has been the product of the landowning farmer; and on the agricultural changes now in progress, which appear to threaten his existence, depends in great measure the future constitution of American society.

TABLE 24.—PROGRESS OF AGRICULTURE, 1900 TO 1910, ACCORDING TO THE U. S. CENSUS

Items	1900	1910	Percentage of increase or decrease	Per 100 of the country population	
				1900	1910
I. Population:					
1. Country population	890,252	898,550	.9	....	....
2. Town population	861,142	1,177,158	36.7	....	....
3. Total population	1,751,394	2,075,708	18.5	....	....
II. Acreage:					
4. Improved land, acres	18,442,585	19,643,533	6.5	2,071.6	2,186.1
5. Woodland, acres	(No report)	3,922,391	....	....	436.5
6. Other unimproved land, acres	(No report)	4,109,899	....	....	457.4
7. Total unimproved land, acres	7,805,913	8,032,290	2.9	876.8	893.9
8. Total land in farms, acres	26,248,498	27,675,823	5.4	2,948.4	3,080.1
9. Percentage of farm land improved	70.3	71.0	.1	....	....

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[66] *University of Minnesota Studies in Economics*, No. 1, 5.

Items	1900	1910	Percentage of increase or decrease	Per 100 of the country population	
				1900	1910
10. Percentage of land area in farms, acres	50.7	53.5	5.6	....	....
11. Number of farms	154,659	156,137	1.0	17.4	17.4
12. Average size of farms, acres	169.7	177.3	4.5	....	....
13. Average improved land per farm, acres	119.2	125.8	5.5	....	....
III. Farms by size groups:					
14. Under 3 acres, number	555	294	—47.0	.06	.03
15. Under 3 acres, percentage of total	.4	.2	—50.0	....	....
16. 3 to 9 acres, number	1,994	2,555	28.1	.22	.28
17. 3 to 9 acres, percentage of total	1.3	1.6	23.6	....	....
18. 10 to 19 acres, number	2,254	2,770	22.9	.25	.31
19. 10 to 19 acres, percentage of total	1.5	1.8	20.0	....	....
20. Total under 20 acres, number	4,803	5,619	17.0	.54	.63
21. Total under 20 acres, percentage of total farms	3.1	3.6	16.2	....	....
22. Total under 20 acres, percentage of all farm land	.2	.2	0.0	....	....
23. Total under 20 acres, percentage of improved land	.2	.2	0.0	....	....
24. Total under 20 acres, percentage of total value of land and buildings	.9	1.1	22.2	....	....
25. 20 to 49 acres, number	13,278	12,028	—9.4	1.49	1.34
26. 20 to 49 acres, percentage of total farms	8.6	7.7	—10.5	....	....
27. 20 to 49 acres, percentage of all farm land	1.9	1.6	—15.8	....	....
28. 20 to 49 acres, percentage of improved land	1.5	1.2	—20.0	....	....
29. 20 to 49 acres, percentage of total value of land and buildings	2.6	2.3	—11.5	....	....
30. 50 to 99 acres, number	30,990	26,571	—14.3	3.48	2.96
31. 50 to 99 acres, percentage of total farms	20.0	17.0	—15.0	....	....
32. 50 to 99 acres, percentage of all farm land	8.8	7.4	—15.9	....	....
33. 50 to 99 acres, percentage of improved land	7.7	6.4	—16.9	....	....
34. 50 to 99 acres, percentage of total value of land and buildings	10.4	8.5	—18.3	....	....
35. 100 to 174 acres, number	56,785	55,424	—2.4	6.38	6.17
36. 100 to 174 acres, percentage of total farms	36.7	35.5	—3.3	....	....
37. 100 to 174 acres, percentage of all farm land	32.4	29.0	—10.5	....	....
38. 100 to 174 acres, percentage of improved land	30.6	26.7	—12.7	....	....
39. 100 to 174 acres, percentage of total value of land and buildings	31.1	28.2	—9.3	....	....
40. 175 to 259 acres, number	24,933	27,972	12.2	2.80	3.11
41. 175 to 259 acres, percentage of total	16.1	17.9	11.2	....	....
42. 260 to 499 acres, number	20,540	24,864	21.1	2.31	2.77
43. 260 to 499 acres, percentage of total	13.3	15.9	19.5	....	....
44. 175 to 499 acres, number	45,473	52,836	16.2	5.11	5.88

Items	1900	1910	Percentage of increase or decrease	Per 100 of the country population	
				1900	1910
45. 175 to 499 acres, percentage of total farms	29.4	33.8	15.0	....	....
46. 175 to 499 acres, percentage of all farm land	47.1	52.4	11.3	....	....
47. 175 to 499 acres, percentage of improved land	50.4	55.5	10.1	....	....
48. 175 to 499 acres, percentage of total value of land and buildings	46.9	51.8	10.5	....	....
49. 500 to 999 acres, number	2,965	3,359	13.3	.33	.37
50. 500 to 999 acres, percentage of total farms	1.9	2.2	15.8	....	....
51. 500 to 999 acres, percentage of all farm land	7.1	7.7	8.5	....	....
52. 500 to 999 acres, percentage of improved land	7.5	8.2	9.3	....	....
53. 500 to 999 acres, percentage of total value of land and buildings	6.3	6.8	7.9	....	....
54. 1,000 acres and over, number	365	300	—17.8	.04	.03
55. 1,000 acres and over, percentage of total farms	.2	.2	0.0	....	....
56. 1,000 acres and over, percentage of all farm land	2.4	1.7	—29.2	....	....
57. 1,000 acres and over, percentage of improved land	2.1	1.7	—23.5	....	....
58. 1,000 acres and over, percentage of total value of land and buildings	1.8	1.4	—22.2	....	....
IV. Crop Products:					
59. Wheat, acres	6,560,707	3,276,911	—50.1	736.9	364.7
60. Wheat, bushels	95,278,660	57,094,412	—40.1	10,702.4	6,354.1
61. Wheat, value	$50,601,948	$56,007,435	10.7	$5,684.00	$6,233.09
62. Oats, acres	2,201,325	2,977,258	35.2	247.3	331.3
63. Oats, bushels	74,054,150	93,897,717	26.8	8,318.3	10,449.9
64. Oats, value	$15,829,804	$34,023,389	114.9	$1,778.13	$3,786.47
65. Barley, acres	877,845	1,573,761	79.3	98.6	175.1
66. Barley, bushels	24,314,240	34,927,773	43.6	2,731.2	3,881.1
67. Barley, value	$7,220,739	$17,213,817	138.4	$811.09	$1,915.73
68. Rye, acres	118,869	266,567	124.3	13.4	29.7
69. Rye, bushels	1,866,150	4,426,028	137.2	209.6	492.6
70. Rye, value	$783,852	$2,679,987	241.9	$88.05	$300.26
71. Buckwheat, acres	6,700	10,309	53.9	.8	1.1
72. Buckwheat, bushels	82,687	144,861	75.2	9.3	16.1
73. Buckwheat, value	$43,741	$89,058	103.6	$4.91	$9.91
74. Emmer and spelt, acres	(No report)	30,891	....	....	3.4
75. Emmer and spelt, bushels	(No report)	757,339	....	....	84.3
76. Emmer and spelt, value	(No report)	$338,841	....	....	$37.71
77. Total small grains, acres	9,765,446	8,135,697	—16.7	1,096.9	905.4
78. Total small grains, bushels	195,595,887	191,248,130	—2.2	21,970.8	21,284.1
79. Total small grains, value	$74,480,084	$110,352,527	48.2	$8,366.18	$12,281.18
80. Corn, acres	1,441,580	2,004,068	39.0	161.9	223.0
81. Corn, bushels	47,256,920	67,897,051	43.7	5,308.3	7,556.3
82. Corn, value	$11,337,105	$30,510,145	169.1	$1,273.48	$3,395.49
83. Kafir corn and Milo maize, acres	43	75	74.5	.005	.008
84. Kafir corn and Milo maize, bushels	1,096	3,335	204.3	.12	.39
85. Kafir corn and Milo maize, value	$366	$1,466	300.5	$0.04	$0.16

Items	1900	1910	Percentage of increase or decrease	Per 100 of the country population	
				1900	1910
86. Peas, dry, acres	670	835	24.6	.08	.09
87. Peas, dry, bushels	9,021	14,964	65.9	1.0	1.7
88. Peas, dry, value	$9,338	$18,384	96.9	$1.05	$2.04
89. Beans, dry, acres	3,290	4,697	42.8	.4	.5
90. Beans, dry, bushels	36,317	62,822	73.0	4.1	7.0
91. Beans, dry, value	$49,685	$124,996	151.6	$5.58	$13.91
92. Irish potatoes, acres	146,659	223,692	52.5	16.5	24.9
93. Irish potatoes, bushels	14,643,327	26,802,948	83.0	1,644.8	2,982.9
94. Irish potatoes, value	$3,408,997	$7,685,259	125.4	$382.92	$855.29
95. Sweet potatoes, acres	4	Less than 1 acre	....	.0005	.0001
96. Sweet potatoes, bushels	136	50	—63.2	.015	.006
97. Sweet potatoes, value	$149	$80	—46.3	$0.02	$0.009
98. Flaxseed, acres	566,801	358,426	—36.8	63.7	39.9
99. Flaxseed, bushels	5,895,479	3,277,238	—44.4	662.2	364.7
100. Flaxseed, value	$5,898,556	$4,863,328	—17.6	$662.57	$541.24
101. Clover seed, bushels	8,034	48,013	497.6	.9	5.3
102. Clover seed, value	$34,536	$326,299	844.8	$3.88	$36.31
103. Grass seed, bushels	561,973	945,666	68.3	62.2	105.2
104. Grass seed, value	$529,301	$1,496,438	182.7	$59.46	$166.54
105. Peanuts, acres	0	1	....	....	.0001
106. Peanuts, bushels	0	15	....	....	.002
107. Peanuts, value	0	$34	....	....	$0.004
108. Total bushel crops, bushels	263,999,060	290,300,232	10.0	29,654.4	32,307.6
109. Total bushel crops, value	$95,748,117	$155,378,956	62.3	$10,755.17	$17,292.19
Hay and Forage Crops:					
110. Wild, salt and prairie grasses, acres	2,196,623	1,988,664	—9.4	246.7	221.3
111. Wild, salt and prairie grasses, tons	2,842,234	2,714,121	—4.5	319.3	302.1
112. Wild, salt and prairie grasses, value	(No report)	$9,609,031	....	....	$1,069.39
113. Millet and Hungarian grasses, acres	58,339	27,136	—53.5	6.6	3.0
114. Millet and Hungarian grasses, tons	93,954	50,383	—46.4	10.6	5.6
115. Millet and Hungarian grasses, value	(No report)	$231,527	....	....	$25.77
116. Alfalfa, acres	658	2,288	247.8	.07	.25
117. Alfalfa, tons	1,781	6,314	254.6	.20	.70
118. Alfalfa, value	(No report)	$44,540	....	....	$4.96
119. Clover, acres	74,669	57,358	—23.2	8.4	6.3
120. Clover, tons	128,767	106,334	—17.4	14.5	11.8
121. Clover, value	(No report)	$572,799	....	....	$63.74
122. Timothy and clover mixed, acres	(No report)	829,600	....	....	92.3
123. Timothy and clover mixed, tons	(No report)	1,433,075	....	....	159.5
124. Timothy and clover mixed, value	(No report)	$7,915,659	....	....	$880.94
125. Timothy alone, acres	(No report)	780,375	....	....	86.8
126. Timothy alone, tons	(No report)	1,101,510	....	....	123.0
127. Timothy alone, value	(No report)	$5,913,196	....	....	$658.08
128. Other cultivated grasses, acres	754,246	118,493	—84.3*	84.7	13.2
129. Other cultivated grasses, tons	1,114,459	188,371	—83.1	125.2	21.0
130. Other cultivated grasses, value	(No report)	$793,169	....	....	$88.27
131. Total cultivated hay and forage, acres	961,067	1,957,408	103.7	108.0	217.8
132. Total cultivated† hay and forage, tons	1,497,094	3,322,626	121.9	168.2	369.8

*Decrease due to difference in definition.

†Excluding corn stalks.

Items	1900	1910	Percentage of increase or decrease	Per 100 of the country population	
				1910	1910
133. Total cultivated hay and forage, value	(No report)	$17,115,770	....	....	$1,904.82
134. Grains cut green for hay, acres	26,304	19,981	—24.0	3.0	2.2
135. Grains cut green for hay, tons	45,633	31,060	—31.9	5.1	3.5
136. Grains cut green for hay, value	(No report)	$143,120	....	....	$15.93
137. Forage crops sown for forage, acres	46,851	121,619	159.6	5.3	13.5
138. Forage crops sown for forage, tons	112,500	401,614	257.0	12.6	44.7
139. Forage crops sown for forage, value	(No report)	$1,471,445	....	....	$163.76
140. Root forage, acres	(No report)	558	....	....	.06
141. Root forage, tons	(No report)	3,965	....	....	.44
142. Root forage, value	(No report)	$30,315	....	....	$3.37
143. Total hay and forage, acres	3,157,690	3,946,072	25.0	354.7	439.2
144. Total hay and forage, tons	4,339,328	6,036,747	39.1	487.4	671.8
145. Total hay and forage, value	(No report)	$26,724,801	....	....	$2,974.21
146. Tobacco, acres	117	150	28.2	.01	.02
147. Tobacco, pounds	127,730	173,321	35.7	14.3	19.3
148. Tobacco, value	$12,869	$20,554	59.7	$1.45	$2.29
149. Hops, acres	Less than 1 acre	Less than 1 acre	....	Less than .0001	Less than .0001
150. Hops, pounds	51	372	629.5	.006	.04
151. Hops, value	$9	$38	322.2	$0.001	$0.004
152. Broom corn, acres	149	13	—91.0	.017	.001
153. Broom corn, pounds	76,960	10,259	—86.7	8.6	1.1
154. Broom corn, value	$4,121	$738	—82.3	$0.46	$0.08
155. Maple sugar, pounds	29,580	11,399	—61.5	3.3	1.3
156. Maple sugar, value	$2,733	$1,742	—36.3	$0.31	$0.19
157. Maple syrup, gallons	1,079	17,808	1,550.4	.12	2.0
158. Maple syrup, value	$939	$21,620	2,202.4	$0.10	$2.41
159. Sorghum, acres	2,283	1,709	—25.1	.25	.2
160. Sorghum, production, tons	14,369	13,253	—7.8	1.6	1.5
161. Sorghum, production, value	$59,714	$83,966	40.6	$6.71	$9.34
162. Sorghum, used as forage, tons	(No report)	396	....	....	.04
163. Sorghum, used for syrup, tons	(No report)	12,857	....	....	1.4
164. Sorghum syrup, gallons	157,605	143,934	—8.7	17.7	16.0
165. Sugar beets, acres	2,114	2,238	5.9	.24	.25
166. Sugar beets, tons	15,959	24,140	51.3	1.8	2.7
167. Sugar beets, value	$59,826	$118,625	98.3	$6.72	$13.20
168. Sugar beets used as forage, tons	(No report)	384	....	....	.04
169. Sugar beets used for sugar, tons	(No report)	23,756	....	....	2.6
170. Flax fiber and straw, tons sold	(No report)	10,704	....	....	1.2
171. Flax fiber and straw, amount received	(No report)	$55,209	....	....	$6.15
172. Other straw, tons sold	(No report)	14,294	....	....	1.6
173. Other straw, amount received	(No report)	$34,666	....	....	$3.86
174. Cornstalks and leaves, tons sold	(No report)	2,417	....	....	.3
175. Cornstalks and leaves, amount received	(No report)	$7,477	....	....	$0.83
176. Total receipts from sales of straw.	$4,410	$97,352	2,107.5	$0.50	$10.83
177. Vegetables (other than potatoes, sweet potatoes and yams), acres	28,361	46,021	62.3	3.2	5.1
178. Vegetables (other than potatoes, sweet potatoes and yams), value	$1,503,401	$3,359,052	123.4	$168.88	$373.83
179. Forest products of farms, total value	$2,602,335	$5,181,508	99.1	$292.32	$576.65

Items	1900	1910	Percentage of increase or decrease	Per 100 of the country population	
				1900	1910
180. Forest products, used on farms, value	(No report)	$3,023,761	....	....	$336.52
181. Forest products, cut and sold, value	(No report)	$2,024,725	....	....	$225.33
182. Standing timber sold, value	(No report)	$133,022	....	....	$14.80
Fruits and Nuts:					
183. Orchard fruits, trees of bearing age	1,096,444*	1,644,590	1900 data unreliable	123.2	183.0
184. Orchard fruits, trees not of bearing age	(No report)	1,787,107	....	....	198.9
185. Orchard fruits, bushels	143,655	1,066,659	642.5	16.1	118.7
186. Orchard fruits, value of product	$109,050	$801,112	634.6	$12.25	$89.16
187. Apples, trees bearing	875,905*	1,380,396	1900 data unreliable	98.4	153.6
188. Apples, trees not bearing	(No report)	1,571,816	....	....	175.7
189. Apples, bushels	120,143	1,044,156	769.1	13.5	116.2
190. Apples, value of product	(No report)	$769,114	....	....	$85.60
191. Peaches and nectarines, trees bearing	1,626*	1,571	1900 data unreliable	.2	.2
192. Peaches and nectarines, trees not bearing	(No report)	3,837	....	....	.4
193. Peaches and nectarines, bushels	190	599	215.3	.02	.06
194. Peaches and nectarines, value of product	(No report)	$659	....	....	$0.07
195. Pears, trees bearing	3,602*	2,792	1900 data unreliable	.4	.3
196. Pears, trees not bearing	(No report)	4,135	....	....	.5
197. Pears, bushels	226	400	77.0	.03	.04
198. Pears, value of product	(No report)	$465	....	....	$0.05
199. Plums and prunes, trees bearing	191,313*	233,736	1900 data unreliable	21.5	26.4
200. Plums and prunes, trees not bearing	(No report)	167,926	....	....	18.7
201. Plums and prunes, bushels	21,820	19,920	—8.7	2.4	2.1
202. Plums and prunes, value of product	(No report)	$27,808	....	....	$3.09
203. Cherries, trees bearing	19,882*	25,139	1900 data unreliable	2.2	2.8
204. Cherries, trees not bearing	(No report)	38,399	....	....	4.3
205. Cherries, bushels	960	1,526	59.0	.1	.17
206. Cherries, value of product	(No report)	$2,973	....	....	$0.33
207. Apricots, trees bearing	87*	66	1900 data unreliable	.01	.007
208. Apricots, trees not bearing	(No report)	175	....	....	.02
209. Apricots, bushels	2	10	400	.0002	.001
210. Apricots, value of product	(No report)	$13	....	....	$0.001
211. Quinces, trees bearing	(No report)	167	....	....	.02
212. Quinces, trees not bearing	(No report)	681	....	....	.08
213. Quinces, bushels	(No report)	2	....	....	.0002
214. Quinces, value of product	(No report)	$5	....	....	$0.0006
215. Grapes, vines bearing	138,175*	61,916	1900 data unreliable	15.6	6.9
216. Grapes, vines not bearing	(No report)	35,950	....	....	4.0
217. Grapes, pounds	573,272	293,805	—48.7	64.4	32.7

*Reported as trees of bearing age; thought by census to include some young trees. See 1910, General Report on Agriculture, p. 707.

Items	1900	1910	Percentage of increase or decrease	Per 100 of the country population	
				1900	1910
218. Grapes, value of product	$15,593	$11,021	—29.3	$1.75	$1.23
219. Cider, gallons	6,111	9,044	48.0	.7	1.0
220. Vinegar, gallons	3,339	5,778	73.0	.4	.6
221. Wine and grape juice, gallons	6,197	4,567	—26.3	.7	.5
222. Dried fruits (including raisins and dried grapes), pounds	500	2,853	470.6	.06	.32
223. Black walnuts, trees bearing	(No report)	7,036	....	....	.8
224. Black walnuts, trees not bearing	(No report)	6,307	....	....	.7
225. Black walnuts, pounds	(No report)	65,074	....	....	7.2
226. Black walnuts, value of product	(No report)	$1,490	....	....	$0.17
227. Pecans, trees bearing	None	6	....	....	.0007
228. Pecans, trees not bearing	(No report)	35	....	....	.004
229. Pecans, pounds	None	25	....	....	.003
230. Pecans, value of product	(No report)	$5	....	....	$0.0006
231. All nuts, trees bearing	(No report)	8,110	....	....	.9
232. All nuts, trees not bearing	(No report)	7,047	....	....	.8
233. All nuts, product, pounds	33,700	81,555	142.0	3.8	9.1
234. All nuts, value of product	$597	$1,838	207.9	$0.07	$0.20
Small Fruits:					
235. Strawberries, acres	1,302	1,873	43.9	.14	.21
236. Strawberries, quarts	2,506,020	2,730,099	8.9	281.5	303.8
237. Strawberries, value	(No report)	$268,772	....	....	$29.91
238. Blackberries and dewberries, acres	162	145	—10.5	.02	.016
239. Blackberries and dewberries, quarts	192,010	139,741	—27.2	21.6	15.6
240. Blackberries and dewberries, value	(No report)	$17,696	....	....	$1.97
241. Raspberries and loganberries, acres	1,115	1,388	24.5	.12	.15
242. Raspberries and loganberries, quarts	1,252,930	1,340,469	7.0	140.7	149.2
243. Raspberries and loganberries, value	(No report)	$178,689	....	....	$19.89
244. Cranberries, acres	22	61	177.3	.002	.007
245. Cranberries, quarts	35,840	22,112	—38.3	4.0	2.5
246. Cranberries, value	(No report)	$1,981	....	....	$0.22
247. Currants, acres	259	200	—22.8	.027	.022
248. Currants, quarts	311,950	182,825	—41.4	35.0	20.3
249. Currants, value	(No report)	$19,783	....	....	$2.20
250. Gooseberries, acres	112	71	—36.7	.01	.008
251. Gooseberries, quarts	128,250	60,661	—52.7	14.4	6.8
252. Gooseberries, value	(No report)	$6,412	....	....	$0.71
253. Total small fruits, acres	3,092	3,738	20.9	.35	.41
254. Total small fruits, quarts	4,542,640	4,476,575	—1.5	510.2	$498.2
255. Total small fruits, value	$339,569	$493,406	45.3	$38.14	$54.92
Flowers and Plants:					
256. Farms and establishments reporting	110	136	23.6	.012	.015
257. Flowers and plants, acres	143	163	14.0	.016	.018
258. Flowers and plants, value of products	$288,055	$603,935	109.7	$32.36	$67.21
259. Florists' establishments, area under glass, square feet	889,986	1,419,496	59.5	100.0	158.0
260. Nursery products, farms and establishments reporting, number	85	191	124.8	.01	.02
261. Nursery products, farms and establishments reporting, acreage	1,127	3,854	242.0	.12	.43

Items	1900	1910	Percentage of increase or decrease	Per 100 of the country population	
				1900	1910
262. Nursery products, farms and establishments reporting, value of products	$383,105	$863,014	125.3	$43.04	$96.05
263. Flower and vegetable seeds, value of	$9,249	$6,645	—28.2	$1.04	$0.74
V. Live Stock on Farms:					
264. Cattle, all, number	1,871,325	2,347,435	25.4	210.2	261.2
265. Cattle, all, value	$36,248,958	$50,306,372	38.8	$4,071.76	$5,598.62
266. Dairy cows, number	753,632	1,085,388	44.0	84.7	120.8
267. Dairy cows, value	$21,513,337	$33,276,653	54.7	$2,416.55	$3,703.37
268. Other cows, number	68,565	218,948	219.3	7.7	24.4
269. Other cows, value	$1,689,684	$4,616,179	173.2	$189.80	$513.74
270. Heifers, number	211,162	323,948	53.4	23.8	36.1
271. Heifers, value	$3,299,865	$3,842,647	16.4	$370.67	$427.65
272. Calves, number	565,994	373,537	—34.0	63.6	41.6
273. Calves, value	$4,254,414	$1,952,261	—54.1	$477.89	$217.27
274. Steers and bulls, number	271,972	345,614	27.1	30.6	38.5
275. Steers and bulls, value	$5,491,658	$6,618,632	20.5	$616.86	$736.59
276. Horses, all, number	696,469	753,184	8.1	78.2	83.8
277. Horses, all, value	$42,255,044	$89,068,872	110.8	$4,746.41	$9,912.51
278. Mature horses, number	599,566	675,509	12.7	67.3	75.2
279. Mature horses, value	$39,252,715	$84,779,112	116.0	$4,409.17	$9,435.10
280. Yearling horses, number	51,399	63,069	22.7	5.77	7.0
281. Yearling horses, value	$2,031,557	$3,840,249	89.0	$228.20	$427.86
282. Horse colts, number	45,504	14,606	—67.9	5.1	1.6
283. Horse colts, value	$970,772	$449,511	—53.7	$109.04	$50.08
284. All mules, number	8,339	5,775	—30.8	.9	.6
285. All mules, value	$486,580	$732,723	50.6	$54.65	$81.64
286. Mature mules, number	6,804	5,213	—23.4	.8	.6
287. Mature mules, value	$422,878	$697,451	64.9	$47.50	$77.71
288. Yearling mules, number	813	444	—45.4	.1	.05
289. Yearling mules, value	$39,020	$31,077	—20.4	$4.39	$3.46
290. Mule colts, number	722	118	—69.8	.08	.01
291. Mule colts, value	$24,682	$4,195	—83.0	$2.77	$0.47
292. All asses and burros, number	161	219	36.0	.02	.02
293. All asses and burros, value	$11,475	$22,857	99.2	$1.29	$2.55
294. All swine, number	1,440,806	1,520,257	5.5	161.8	169.4
295. All swine, value	$5,865,590	$13,929,127	137.8	$658.87	$1,551.91
296. All sheep, number	589,878	637,582	8.1	66.3	71.0
297. All sheep, value	$1,740,088	$2,693,424	54.8	$195.46	$300.09
298. Ewes, number	329,984	417,652	56.9	37.1	46.5
299. Ewes, value	$1,205,275	$2,190,295	81.7	$135.38	$244.03
300. Rams and wethers, number	29,344	34,419	17.3	3.3	3.8
301. Rams and wethers, value	$124,256	$193,642	55.8	$13.96	$21.57
302. Lambs, number	230,550	185,511	—19.5	25.9	20.7
303. Lambs, value	$410,557	$309,487	—24.6	$46.12	$34.48
304. Goats, number	3,821	4,588	20.0	.44	.51
305. Goats, value	$12,908	$18,480	43.2	$1.45	$2.06
306. All domestic animals (except poultry), number	4,610,799	5,269,040	14.3	517.9	586.4
307. All domestic animals (except poultry), value	$86,620,643	$156,771,855	81.0	$9,729.90	$17,466.64
VI. Poultry and Bees on Farms:					
308. All fowls, number	8,142,693	10,697,075	31.4	914.6	1,191.8
309. All fowls, value	$2,274,649	$4,646,960	104.3	$255.51	$517.74

Items	1900	1910	Percentage of increase or decrease	Per 100 of the country population	
				1900	1910
310. Chickens, number	7,730,940	10,293,849	33.1	868.4	1,146.9
311. Chickens, value	(No report)	$4,231,729	....	....	$471.48
312. Turkeys, number	193,143	147,335	—23.7	21.7	16.4
313. Turkeys, value	(No report)	$224,096	....	....	$24.97
314. Ducks, number	127,635	94,269	—26.1	14.3	10.5
315. Ducks, value	(No report)	$55,322	....	....	$6.16
316. Geese, number	90,975	105,161	15.6	10.2	11.7
317. Geese, value	(No report)	$122,596	....	....	$13.66
318. Guinea fowls, pigeons, and pea fowls, number	(No report)	56,461	....	....	6.3
319. Guinea fowls, pigeons, and pea fowls, value	(No report)	$13,217	....	....	$1.47
320. Colonies of bees, number	45,877	56,677	23.6	5.2	6.3
321. Colonies of bees, value	$167,280	$221,781	32.6	$18.79	$24.71
VII. Animal Products:					
322. Value of dairy products of farms	$16,623,460*	$30,629,649†	84.3	$1,867.28	$3,412.58
323. Average value, per farm	$119	$218	83.2	....	....
324. Average value, per cow	$22.06	$28.22	27.9	....	....
325. Milk produced, gallons	304,017,106‡	409,191,276¶	34.6	34,149.6	45,589.8
326. Butter made on farms, pounds	41,188,846	34,708,669	—15.7	4,626.7	3,867.0
327. Butter made on farms, value	(No report)	$8,593,233	....	....	$957.41
328. Butter made in factories,‖ pounds	41,174,469	88,842,846	115.8	4,625.0	9,898.4
329. Total butter, pounds	82,363,315	123,551,515	50.0	9,251.7	13,765.4
330. Cheese made on farms, pounds	290,623	106,075	—63.5	32.6	11.8
331. Cheese made on farms, value	(No report)	$14,375	....	....	$1.60
332. Cheese made in factories,‖ pounds	3,285,019	2,735,883	—16.7	369.0	304.8
333. Total cheese, pounds	3,575,642	2,841,958	—20.5	401.6	316.6
Receipts from Sales and Quantity Sold:					
334. Milk sold, gallons	103,768,172	53,181,785	—48.7	11,656.0	5,925.2
335. Milk sold, amount received	$7,039,631	$6,146,512	—12.7	$790.75	$684.81
336. Cream sold, gallons	1,205,845	5,756,165	377.4	135.4	641.3
337. Cream sold, amount received	$551,992	$3,542,993	541.9	$62.00	$394.74
338. Butter fat sold, pounds	(No report)	40,414,151	....	....	4,502.7
339. Butter fat sold, amount received	(No report)	$10,922,293	....	....	$1,216.90
340. Butter sold, pounds	22,376,084	18,016,409	—19.5	2,513.5	2,007.3
341. Butter sold, amount received	$3,500,323	$4,591,554	31.2	$393.19	$511.57
342. Cheese sold, pounds	227,878	79,045	—65.3	25.6	8.8
343. Cheese sold, amount received	$22,745	$10,870	—52.2	$2.55	$1.21
344. All dairy products, receipts from sales	$11,114,691	$25,214,222	126.9	$1,248.48	$2,809.23
345. Wool, number of fleeces shorn§	376,009	453,583	20.6	42.2	50.5
346. Wool, pounds§	2,612,737	3,259,282	24.7	293.5	361.1
347. Wool, value§	$460,305	$816,866	77.5	$51.71	$91.01
348. Mohair, number of fleeces	350	1,952	457.7	.04	.22
349. Mohair, pounds	556	6,929	1,146.3	.06	.77
350. Mohair, value	$180	$1,987	1,003.9	$0.02	$0.22

*Including home consumption.

†As estimated (excludes home consumption of milk and cream).

‡As published (includes estimates).

§Including estimates. See Census 1910, General Report on Agriculture, p. 492.

¶As estimated by Census Bureau. General Report on Agriculture, 1910, p. 476.

‖The number of factories producing cheese and butter were:

	1900	1910
By Census:		
Cheese factories Butter factories	596	784
By State Dairy Dept.:		
Cheese factories	73[1]	69[2]
Butter factories	690[1]	797[2]

[1] Reported for 1901.

[2] Reported for 1909 season.

Items	1900	1910	Percentage of increase or decrease	Per 100 of the country population	
				1900	1910
351. Poultry raised,* number	(No report)	11,862,787	....	....	1,321.7
352. Poultry raised,* value	$2,927,717	$4,714,919	61.0	$328.87	$525.31
353. Eggs produced,* dozens	43,208,130	53,807,974	24.5	4,853.5	5,995.0
354. Eggs, produced,* value	$4,437,148	$9,767,410	120.1	$498.41	$1,088.23
355. Honey, pounds	986,446	976,262	—1.0	110.8	108.8
356. Honey, value	(No report)	$120,560	....	....	$13.43
357. Beeswax, pounds	20,626	16,880	—18.2	2.3	1.9
358. Beeswax, value	(No report)	$4,057	....	....	$0.45
359. Value of honey and wax	$118,884	$124,617	4.8	$13.35	$13.88
360. Domestic animals sold, receipts from sales	$16,046,622	$34,121,517	112.6	$1,802.48	$3,801.63
361. Domestic animals slaughtered on farms, value	$4,908,051	$6,942,498	63.9	$551.31	$773.49
362. Value of all classes of domestic animals, sold or slaughtered	$20,954,673	$41,064,015	96.0	$2,353.79	$4,575.12
363. Sheep sold, receipts	(No report)	$1,153,716	....	....	$128.54
364. Sheep slaughtered, value	(No report)	$71,202	....	....	$7.93
365. Swine sold, receipts	(No report)	$13,999,240	....	....	$1,559.71
366. Swine slaughtered, value	(No report)	$4,908,163	....	....	$546.84
367. Cattle (excluding calves), sold, receipts	(No report)	$11,958,640	....	....	$1,332.36
368. Cattle (excluding calves), slaughtered, value	(No report)	$1,528,060	....	....	$170.25
369. Calves sold, receipts	(No report)	$1,067,071	....	....	$118.89
370. Calves slaughtered, value	(No report)	$434,501	....	....	$48.41
371. Horses sold, receipts	(No report)	$5,847,186	....	....	$651.46
372. Mules sold, receipts	(No report)	$85,498	....	....	$9.53
VIII. Farm Values:					
373. All farm property	$788,684,642	$1,476,411,737	87.2	$88,591.17	$164,493.52
374. Land (without buildings)	$559,301,900	$1,019,102,027	82.2	$62,825.12	$113,542.63
375. Buildings	$110,220,415	$243,339,399	120.8	$12,380.81	$27,111.51
376. Farms (including buildings)	$669,522,315	$1,262,441,426	88.6	$75,205.93	$140,654.15
377. Implements and machinery	$30,099,230	$52,329,165	73.9	$3,380.98	$5,830.22
378. Live stock	$89,063,097	$161,641,146	81.5	$10,004.26	$18,009.15
379. Value of all crops	(No report)	$193,451,474	....	....	$21,553.28
380. Value of all live stock products	(No report)	$43,536,726	....	....	$4,850.62
381. Receipts from sale of animals	$16,046,622	$34,121,517	112.6	$1,802.48	$3,801.63
382. Value of animals slaughtered	$4,908,051	$6,942,498	63.9	$551.31	$773.49
383. Expended for labor (including board)	$16,657,820	$22,330,149	34.1	$1,871.14	$2,487.90
384. Fertilizers purchased	$251,120	$74,653	—70.2	$28.21	$8.32
385. Feed purchased	(No report)	$5,041,925	....	....	$557.74
386. Value of farm products fed to livestock	$33,257,480	(No report)	....	$3,735.74	....
387. Value of products not fed	$127,959,824	(No report)	....	$14,373.44	....
388. Total value of farm products	$161,217,304	$278,052,215†	72.5	$18,109.18	$30,171.60†
IX. Farm Tenure:					
389. Number of all farms	154,659	156,137	1.0	17.4	17.4
Operated by owners:					
390. Operated by part owners, number	14,805	22,611	52.7	1.7	2.5

*Including estimates. See census 1910, General Report on Agriculture, p. 505.

†Sum of items 379 to 382, which include the following:

Value of all crops	$193,451,474
Value of dairy products excluding home use of milk and cream	29,219,406
Value of poultry and eggs produced	13,496,745
Value of honey and wax	124,617
Value of wool and mohair	695,958
Receipts from sale of animals	34,121,517
Value of animals slaughtered	6,942,498
	$278,052,215

Items	1900	1910	Percentage of increase or decrease	Per 100 of the country population	
				1900	1910
391. Operated by part owners, percentage of all farms	9.6	14.5	51.0	....	....
392. Operated by complete owners, number	112,004	99,493	—11.2	12.6	11.1
393. Operated by complete owners, percentage of all farms	72.4	63.7	—12.0	....	....
Total operated by owners:					
394. Number	126,809	122,104	—3.7	14.2	13.6
395. Percentage of all farms	82.0	78.2	—4.6	....	....
396. Area in acres	20,893,966	20,668,885	—1.1	2,347.0	2,300.2
397. Percentage of total land in farms	79.6	74.7	—6.2	....	....
398. Average size, acres	164.8	169.3	2.7	....	....
399. Improved land, acres	14,357,865	14,153,505	—1.4	1,612.8	1,575.1
400. Percentage of total improved land	77.8	72.1	—7.4	....	....
401. Average improved land, per farm, acres	113.2	115.9	2.4	....	....
402. Percentage of farm land improved	68.7	68.5	—0.3	....	....
403. Value of land and buildings	$519,971,545	$920,359,347	77.0	$58,407.23	$102,427.17
404. Percentage of total value of land and buildings	77.7	72.9	—6.2	....	....
405. Average value per farm	$4,100	$7,538	83.9	....	....
406. Average value per acre	$24.89	$44.53	78.9	....	....
Operated by managers:					
407. Number	1,095	1,222	11.6	.12	.13
408. Percentage of all farms	0.7	0.8	14.4	....	....
409. Area in acres	486,147	413,734	—14.9	54.6	46.0
410. Percentage of total land in farms	1.9	1.5	—21.1	....	....
411. Average size, acres	444.0	338.6	—23.7	....	....
412. Improved land, acres	293,012	285,241	—2.7	32.9	31.7
413. Percentage of total improved land	1.6	1.5	—6.3	....	....
414. Average improved land per farm, acres	267.6	233.4	—12.8	....	....
415. Percentage of farm land improved	60.3	68.9	14.3	....	....
416. Value of land and buildings	$11,703,470	$20,909,251	78.7	$1,314.62	$2,327.00
417. Percentage of total value of land and buildings	1.7	1.7	0.0	....	....
418. Average value per farm	$10,688	$17,111	60.1	....	....
419. Average value per acre	$24.07	$50.54	110.0	....	....
Operated by tenants:					
420. Operated by cash tenants, number	5,129	10,566	106.0	.6	1.2
421. Operated by cash tenants, percentage of all farms	3.3	6.8	106.1	....	....
422. Operated by share tenants, number	21,626	22,245	2.9	2.4	2.5
423. Operated by share tenants, percentage of all farms	14.0	14.2	1.4	....	....
Total operated by tenants:					
424. Number	26,755	32,811	22.6	3.0	3.7
425. Percentage of all farms	17.3	21.0	21.4	....	....
426. Area in acres	4,868,385	6,593,204	35.4	546.9	733.8
427. Percentage of total land in farms	18.5	23.8	28.7	....	....
428. Average size, acres	182.0	200.9	10.4	....	....
429. Improved land, acres	3,791,708	5,204,787	37.3	425.9	579.2
430. Percentage of total improved land	20.6	26.5	28.7	....	....

Items	1900	1910	Percentage of increase or decrease	Per 100 of the country population	
				1900	1910
431. Average improved land per farm, acres	141.7	158.6	11.9	....	....
432. Percentage of farm land improved	77.9	78.9	1.3	....	....
433. Value of land and buildings	$137,847,300	$321,172,828	60.4	$15,484.08	$35,743.46
434. Percentage of total value of land and buildings	20.6	25.4	23.4	....	....
435. Average value per farm	$5,152	$9,789	90.5	....	....
436. Average value per acre	$28.31	$48.71	72.1	....	....
X. Farm Indebtedness:					
437. Owned farms, total number†	125,405*	122,104	—2.6	13.7	13.6
438. Free from mortgage, number	66,922	65,038	—2.8	7.5	7.2
439. Free from mortgage, percentage of total‡	55.2	53.7	—2.7	....	....
440. Mortgaged, number	54,338	56,145	3.3	6.1	6.2
441. Mortgaged, percentage of total‡	44.8	46.3	3.4	....	....
442. Not specified, number	4,145	921	—77.8	.5	.1

ANALYSIS OF RETURNS FOR **1890** AND **1910** ON MORTGAGE INDEBTEDNESS

Items	1890¶	1910§	Percentage of increase or decrease	Per 100 of the country population	
				1890	1910
443. Number of farms or farm homes mortgaged	46,347	41,775§	—9.9	6.5	4.6
444. Value of land and buildings	$119,290,539	$295,015,775	147.3	$16,846.23	$32,832.43
445. Amount of mortgage debt	$37,709,574	$77,866,283	106.5	$5,325.35	$8,665.77
446. Percentage of debt to value	31.6	26.4	—16.5	....	....
447. Average value per farm	$2,574	$7,062	174.4	....	....
448. Average debt per farm	$814	$1,864	129.0	....	....
449. Average equity per farm	$1,760	$5,198	195.3	....	....

*Reported as "owned farm homes."
†Includes all farms owned in whole or in part by the operator.
‡Percentage of combined totals of mortgaged and unmortgaged.
¶Includes all owned farm homes, estimates being made (by the census) of value of farms and amount of debt for all defective reports.
§Includes only farms consisting wholly of owned land and reporting value of farm and amount of debt, whereas the figures in the 1900-1910 comparison are more inclusive.